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MODERN BATHS AND BATH HOUSES

WORKS BY WM. PAUL GERHARD

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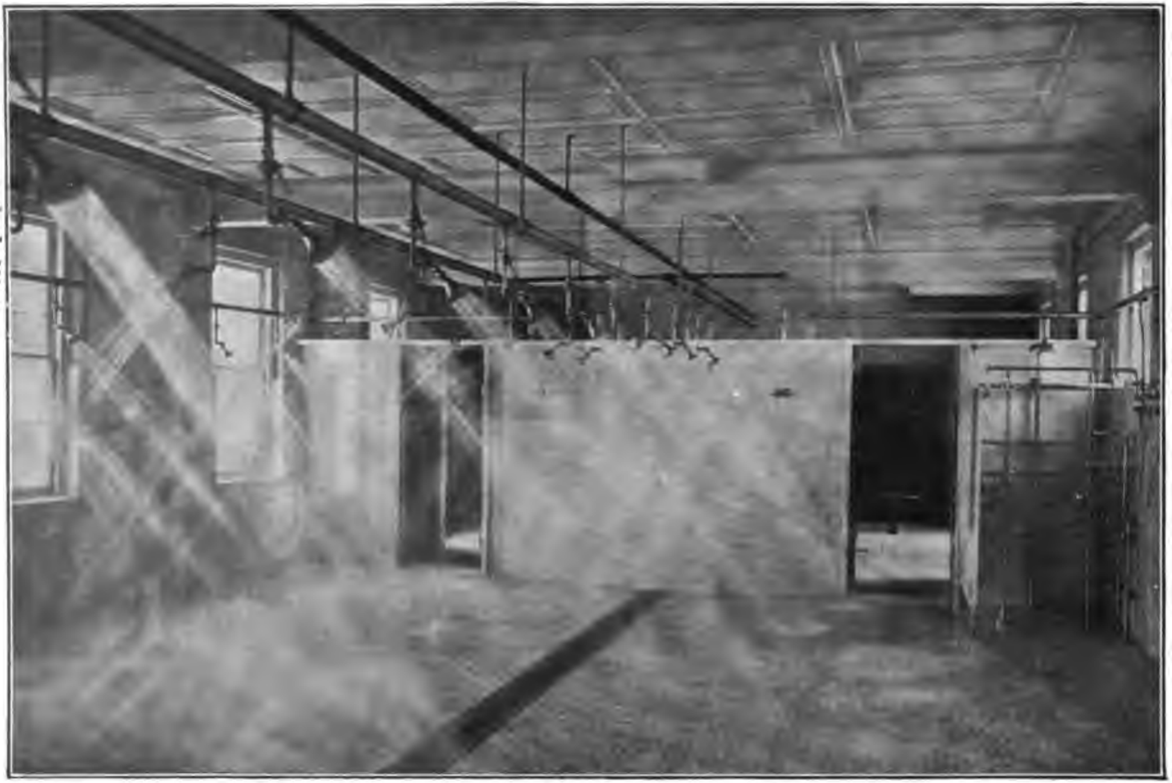

[*Frontispiece.*] FIG. 76. INTERIOR VIEW OF RAIN BATHS AT THE UTICA STATE HOSPITAL, SHOWING THE SPRAYS RUNNING.

MODERN BATHS AND BATH HOUSES

BY

WM. PAUL GERHARD, C.E.

◆

FIRST EDITION

FIRST THOUSAND

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PREFACE

DISCUSSING the "uplifting power of the bath," a writer in "Modern Sanitation" recently commented on the fact that "while for many years the subject of 'bathing' enjoyed a long slumber, it is gratifying to note the now constantly increasing reference to bathing and its benefits."

In his practice as a sanitary engineer the author has had ample opportunity to deal with the subject of baths and bath houses in a practical way. Many of the baths in State hospitals and other institutions were installed under his superintendence, and the plumbing, water-supply and sanitary features of a number of the public or people's bath houses in the city of New York were planned and specified by him.

A recent extended trip abroad gave the author an opportunity to visit numerous bath houses with a view of learning, by a personal inspection, how they are planned and equipped on the Continent of Europe.

He saw much regarding hydrotherapeutic, electric-light and air and sun baths that is probably new and of interest to his readers. During a month's stay at one of the best-known sanatoriums in Germany (Dr. Lahmann's, at a small place called "Zum Weissen Hirsch," near the city of Dresden), he took various water baths, electric-light and steam baths, and also the air baths twice daily, beginning with them during cold winter weather in February, 1907. He became particularly impressed with the health-giving qualities of these air baths. In order to make them better known in the United States he devoted an entire chapter to this novel form of bathing, and included in it some interesting illustrations.

The modern spray or "rain bath," the discussion of which occupies several chapters, is by this time so well known both

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abroad and here that it is no longer novel. It remains, as was predicted by the author's earlier pamphlets and lectures on "Rain Baths," the best and most popular form of bathing for the masses.

A word about the illustrations of this book. They are gleaned from many different sources, and as far as was possible the author named the sources from which they were taken, and gave credit where an acknowledgment was due. Some of the plans and details are taken from his own practice in the line of domestic sanitary engineering. Others, and particularly the views from European bath houses, were gathered by him during his trip.

Though he traveled much in Europe in former years and during his recent trip, and though he lived for many years in Africa as well as in the United States, it never was the good fortune of the author to visit some of the far Eastern countries, such as Russia and Japan, or the countries of the "Land of the Midnight Sun." In books of travel one reads a good deal about the peculiar bathing customs of some of these countries, but rather than give "at second-hand" a description of these, merely re-worded by him, the author decided to give in the Appendix some extracts from the observations of well-known travelers, explorers and scientists, among them being Paul du Chaillu, Chamberlin, Fink, Professor Morse and Mrs. Fraser. The author believed that the readers would prefer this way of dealing with the subject, and accordingly his apologies are due to the writers mentioned for his having freely drawn from their books.

To quote again from "Modern Sanitation," "there is no doubt that the widespread distribution of bathing literature will in the end fulfill its every promise, with the result that *we will be better people, morally, physically and intellectually.*"

If the publication of this book should help to attain the high goal outlined in the above-quoted sentence, the author would feel more than well repaid for the time required to prepare it.

THE AUTHOR.

33 UNION SQUARE, NEW YORK,
October, 1907.

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MODERN BATHS AND BATH HOUSES

CHAPTER I

HISTORICAL NOTES

"*In balneis salus*"

THE practice of bathing has since the earliest periods of history been regarded in nearly all countries as conducive to the health and welfare of the human race. The most ancient historical accounts as well as some popular myths make mention of it.

History records the fact that to the ancient nations bathing was not merely a custom or bodily necessity, but that it was, or early became, a practice demanded by, and intimately associated with, the requirements of religious rites and worship. Man, it was thought, ought to present himself pure, both in mind and in body, before entering a temple to engage in the service of his God. The ancient nations appreciated the value of bathing perhaps even more than we do to-day, and bodily cleanliness was considered by them a symbol of moral purity.

Since regular bathing and ablutions of the body were made compulsory by religious rites, it is not surprising to find that baths and special bath houses were established for this purpose in India, Persia, Assyria and in Egypt. To the Hindoo the river Ganges was a holy stream, in which he had to bathe himself at certain days prescribed by his religion. In the same way the river Nile was holy to the Egyptians, who thus became addicted to the bathing habit, and some of their temples are said to have been provided with bathing places.

The Mosaic law required the Hebrews to take regular ablutions of the body before the daily meals, before wedding festivities and birth celebrations, before entering the temple of worship, before all religious ceremonies, and after every contamination. The Israelite girls and women were commanded by strict laws, originally framed by Moses, to bathe at regular monthly intervals, which custom prevails with the orthodox Jews even at the present day. In Palestine the wealthier Jews are said to have had private baths in their dwelling houses and bathing pools in their gardens, and besides this there existed a number of public bath houses.

The care of the body reached a very high stage of development with the Greeks, and later on with the Romans, and the Greeks in particular considered it as quite necessary for a sound development of the mind. Warm baths are mentioned by the poet Homerus, who tells us how his heroes found refreshing and invigorating enjoyment in the baths. A douche or shower bath is shown on an antique Grecian vase, now in the Royal Museum at Berlin. The Spartans were fond of cold baths and hardened their bodies by the frequent use of sea and river baths.

Throughout Greece warm tub baths were provided in the houses of the well-to-do, and were used not only before meals, but also before religious ceremonies, such as weddings, sacrifices and the reception of oracles. Guests were always provided by their host with a bath upon the arrival at his house.

Four centuries before Christ public bath houses were erected by the state in Athens and in other cities, which contained large bathing halls with round or oval swimming pools, and which were freely available to the poorer citizens. Bath houses were also often attached to the gymnasia or the buildings devoted to athletic exercises, and these baths were used, not as a mere matter of luxury, but chiefly for the sake of cleanliness and health.

The Greeks also had medical baths, chiefly hot sulphur spring baths, like those of Thermopylæ and those on the islands of Lesbos, Eubœa and others, which became famous for the cure of certain diseases. It is likewise worth mentioning that the famous Greek physician Hippocrates is considered by some to be the founder of balneology. The Greek bath houses became the prototypes for the later Roman thermæ, and in both countries bath houses attained their highest development.

The Romans indulged perhaps even more than other nations in the practice of luxurious bathing. During the earlier times and while Rome was a republic, their habits were simpler and their public bathing pools or piscinæ were accordingly of a plain character. In the year 305 before Christ a larger public bath house was erected outside of the city walls, which was supplied with water from the first aqueduct built by Appius Claudius. Bath houses multiplied rapidly as additional aqueducts were built, until the daily consumption of water in these places reached the enormous amount of nearly 200 million gallons. In the course of time the bath houses became more and more luxurious.

In the time of the Emperors, Rome had the finest and most luxuriously built and equipped private as well as public bath houses. In these magnificent public buildings the real object of bathing was almost forgotten, for they became rather public pleasure resorts, provided with gymnasia, amphitheaters, gardens and courts, libraries, reading rooms and places for public orators, where Roman citizens went to spend a large part of the day.

It is said that bath houses of similar gorgeousness were provided for women, who were fully as fond of the practice of bathing in company as the men were. History tells us how some of the empresses indulged in the most refined and cunning bathing habits, as for instance the Empress Poppæa, who took daily milk baths, the milk being obtained from 500 asses which she kept specially for this purpose, attended by many slaves. In the houses of the rich, cosmetic baths were indulged in by women to secure a clean, fresh, white and soft skin. Later on the practice of men and women bathing together began, and this led gradually to debauchery and degeneration and to the ultimate abandonment of bathing.

The ruins of the thermæ or baths of Titus, Caracalla and Diocletianus in Rome, of the thermæ of Pompeii and Bajæ in the country near Rome, and of others erected by the Romans in their foreign provinces, as at Aix-la-Chapelle, Baden-Baden, Trier, etc., give evidence of the magnitude, splendor and lavishness of these places. Wherever the Roman army conquered new provinces, bath houses were erected, in particular in places where hot springs, aquæ or thermæ were found.

The Roman historian Tacitus relates that the German tribes practiced and enjoyed cold river bathing, where men and women bathed together, and that they were fond of swimming.

The Emperor Constantine erected some large bath houses in Byzantium and constructed large aqueducts for public water supply. From Byzantium the bathing custom traveled to southern countries around the Mediterranean Sea, to Algiers and to Spain, where the Arabs and the Moors erected many fine baths, like those in the Alhambra at Granada.

The Mohammedans also had religious rites and the Islam religion prescribed the practice of ablutions and the use of the bath. Public baths are even to-day quite common in Turkey as well as in Eygpt.

During the Middle Ages bathing was cultivated but little, though some of the German emperors, like Charlemagne and Barbarossa, were fond of bathing and swimming. Owing to the contact with the Oriental nations during the Holy Crusades, the practice of bathing again became somewhat popular. Bathing pools and tubs were provided, not only in the medieval castles and in the monasteries, but with the growth of civic life, bath houses were established in the cities. We also find mention of some luxurious private baths in the houses of merchant princes, in Italy, France and Germany. The public bath houses, however, degenerated and became the places of loose morals, vice and of infection; the extent of public bathing grew less and less, and finally, when epidemics broke out, the bath houses had to be closed up altogether.

During the seventeenth and eighteenth centuries public bathing became almost extinct, and it is really only since the middle of the nineteenth century that the healthful influence of bathing became once more recognized, and public bath houses were again erected, largely upon the recommendation and the urging of physicians and sanitarians.

In Russia, as in Scandinavia, Denmark and Finland, hot baths and steam baths have always been quite popular with the people, and the practice of bathing seems to be on the increase. (See Appendix, Bathing in Russia, Scandinavia and Finland.)

Some of the American Indians, though not otherwise remarkable for cleanliness, practiced bathing, in water as well as in steam.

In the far Eastern countries of Asia, China seems to be the one nation where bathing is not much practiced, and where no public bath houses exist. The Japanese, on the contrary, are very fond of bathing, particularly of hot baths, and public swimming as well as private tub baths are very numerous, not only in their large cities, but also in the country districts where hot mineral springs occur. (See Appendix, Bathing in Japan.)

* * * * * * *

Thus we see that all cultured nations have practiced bathing, chiefly at a period in their history when they flourished most, and that with the decay of civilization and culture baths also disappeared. Let us now glance very briefly at the development of the modern bath houses. During the first thirty or forty years of the nineteenth century but few public bath houses existed in the large cities. Physicians pointed out the value of bathing and swimming, and military surgeons urged the establishment of swimming baths for soldiers along the river fronts. In Western Europe a new stimulus was given by the Public Bath and Washhouse Act, passed in England in 1846. As a result a large number of public bath houses were built in the principal cities, the first one being erected in Frederick Street, in Liverpool.

In France a law passed in May, 1850, gave the Minister of Commerce means to erect public bath houses; Belgium followed in 1854, and Austria, Germany, Switzerland and Italy soon afterwards, and thus a great number of public bath houses were quickly established on the Continent of Europe, many of these being fitted up with swimming pools and with Russian and Turkish baths, besides numerous tub baths, and so became, in a measure, institutions not unlike those of the days of ancient Rome. While these structures performed a useful function, they could not be considered people's baths in the true meaning of the term, for the rate of admission charged and the comparatively elegant interiors and exteriors kept away the poorer classes of the population, who suffer most from the lack of bathing conveniences in their homes.

The Berlin Public Health Exhibition of 1883 stirred up public sentiment in favor of cheap people's baths, and credit is due chiefly to Prof. Dr. Oscar Lassar of that city for having inaugurated the movement. At this exhibition the first bath for working people was shown and put to a practical test. It was so successful that it was at once adopted by some cities, as well as for military barracks and factories. Similar military baths had been already installed and tried in Berlin in 1878, by Surgeon-General Dr. Muennich, he having demonstrated that in one hour 300 soldiers could be quickly bathed in only eighteen compartments.

The first people's bath was built in Vienna in 1887, in an old building in the Mondscheingasse (see Chapter VIII), where seventy-two bathing cells were installed. About the same time the first school baths were provided in the German cities of Goettingen, Munich and Weimar. All of these people's baths, school, factory and military baths were of the type known as "rain baths," which will be considered more in detail further on.

A similar movement took place in the United States about the year 1891. It must first be mentioned that the necessity of luxurious public bathing establishments was not so keenly felt in America, because here dwellings of the better class are built much more with a view to domestic comfort than those of other countries. They are always provided with bathing conveniences, so that even in small houses the bathroom and the kitchen boiler, furnishing the hot water, are not lacking. What our large cities require, however, is cheap spray or rain baths for the masses of working people, who lack bathing facilities in the tenements. It is the duty of every municipality to provide cheap bath houses or people's baths, for they tend to reduce the general mortality rate of a city, and the number of sick in the city hospitals; and by installing, in the same way, baths in the public schools, more is done to improve the air of classrooms than the most perfect system of ventilation can accomplish, while it also teaches the children to keep themselves clean. (See Chapter X.)

The State of New York was the first to pass, in 1895, a legislative act, making the establishment of people's baths, kept open the year around, mandatory upon all cities having a population of 50,000 or more, and credit is chiefly due to Mr. Goodwin Brown, formerly State Commissioner in Lunacy, for having urged the passage of this act. Many large bath houses were soon built in New York City, as well as in other cities of the State, and Boston, Brooklyn, Philadelphia, Chicago and others soon followed the example.

CHAPTER II

THE PURPOSES OF BATHING

BATHING signifies the immersion of the body, or of parts of the same in, or its exposure to, a liquid, generally water, or else the application of running or falling water, or other liquid, to the entire body or to parts of the same. In a wider sense, we may define "bathing" as a contact of parts of the skin of the body, during a more or less continued period of time, with any semi-liquid, liquid or gaseous medium or substance (thereby including mud baths, sand baths, air, steam and vapor baths), and we can finally include in the term the application of sunlight and electricity (as in the sun baths, electric light baths, etc.).

The word "bath" means, first of all, the washing of the body in, or its exposure to, water or other fluid agent, for various purposes, to which we shall again refer below.

More generally, the word "bath" denotes an arrangement, appliance or fixture by means of which the human body, or parts of it may be subjected to the action of a medium, generally water; it also designates the apartment in which such apparatus stands or is fitted up; it finally is used at times, in a still wider sense, to denote a building or edifice, fitted up for bathing purposes and commonly called a "*bath house*."

Let us briefly inquire into the *objects of bathing*. We may readily distinguish three chief purposes, viz.:

(1) The maintenance of cleanliness;
(2) The maintenance or improvement of health of the human body; and
(3) The cure of disease or the restoration of health.

It is largely with the two former, the hygienic and cleansing baths, that we are concerned in this book; but the principal therapeutic baths are briefly described in Chapters XV and XVI.

The preservation of health and prevention of disease by bathing are accomplished in several ways, of which the following are the most important ones.

Bathing is practiced:

(*a*) For the sake of cleanliness of the surface of the body.
(*b*) For the sake of promoting the proper functions of the skin.
(*c*) For the sake of cooling and refreshing, for the general exhilarating and stimulating, or sometimes for its soothing, effect.
(*d*) For the sake of increasing the blood circulation and the bodily heat.
(*e*) For the sake of hardening the skin against atmospheric influences.
(*f*) For the sake of bodily athletic exercise, as in swimming.

In other words, baths are taken, not merely with a view of personal cleanliness, — although that must always remain the one object of paramount importance, — but they are also indulged in during the warm season, in order to refresh and cool the body, to strengthen and invigorate the system, to open up the pores of the skin and regulate the bodily temperature, to make the muscles more pliable, to render the body less sensitive to changes of temperature, to give a higher degree of endurance, and finally for the enjoyment of healthy muscular exercise.

Warm tub baths and showers are representative forms of baths taken chiefly to obtain and preserve cleanliness, while swimming baths, river and sea baths are the forms of baths largely taken for the sake of pleasurable exercise, for the hardening and strengthening of the body, and for the general comfort as well as cooling and stimulating effect derived from the same.

In the following remarks reference will almost entirely be made to the principal object of bathing, viz., the cleansing of the surface of the body, consisting in the removal of all dust, dirt, perspiration and dead scarfskin. This is best accomplished in a tepid bath with soap. This leads us naturally to say a few words in general about bodily cleanliness.

On Personal Cleanliness—The periodical and thorough cleansing of the surface of the human body by bathing and by general ablutions is a condition for continued health, and becomes a potent factor in prolonging life. This was recognized at all times, and Hippocrates expressed this view in his well-known requirements relating to purity of soil, of the air, the water, of the food and of the body. The best way of preventing disease or epidemics consists in removing quickly all manner of dirt and refuse, whether in the streets, in the houses or on the human body. Uncleanliness of the body may lead to skin diseases, and often causes offensive exhalations due to the putrefaction of the dirt on the skin and in the clothing.

It is also a frequent source of contamination of the air of closed apartments, and this is particularly apparent in places where many persons assemble or congregate together, as in schools, theaters, churches and hospitals. Indeed, bodily exhalations, due to lack of cleanliness of body and underclothing, pollute the air of rooms often to such an extent that the best and most elaborate schemes of ventilation fail utterly, as for instance in schoolrooms, in prisons, military barracks, in courtrooms and in workshops.

Cleanliness of the body is, without doubt, the most important step to be taken for the prevention of the evils associated with foul air of rooms, and it is indispensable for the development and strengthening of the young and the maintenance of health in grown persons.

In order to understand still better the effects of bodily ablutions and baths on the health of the system, it is necessary to consider the structure and function of the human skin.

The Skin and its Functions — Briefly stated, the skin forms the outer surface of the human body, and as such is in constant and more or less intimate contact with the air and with the objects which surround us.

The skin may be taken as being composed of two layers, namely, an outer, thin layer, of innumerable cells or scales, the scarfskin or so-called *epidermis,* and the inside or deeper layer, the true skin or *derma*, which contains the blood vessels and nerves, and on the upper surface of which are ridges or *papillæ*.

Underneath the true skin is a mass of adipose tissue, in which are located the roots of the hair and the sweat and sebaceous glands, leading to the outer surface. The outer skin is subject to abrasion or renewal, and is constantly shed off. Of the two varieties of glands in the skin, the sweat glands accomplish the object of cutaneous perspiration, whereas the oily or sebaceous glands are intended to keep the skin soft and flexible. Both kinds of glands open on the surface in the so-called pores of the skin, and their secretion or discharge is constantly going on in healthy individuals.

Now, what are the functions of the skin? First, it encloses and protects the internal organs against injury; second, it regulates the temperature of the body by perspiration and evaporation; third, it eliminates waste materials from the body and thus acts as an organ of excretion and of purification of the system; fourth, it is the organ of feeling, of touch and of temperature.

If the regular action of the skin is suppressed or interfered with, serious detriment to health may follow. This is precisely what often happens if the cleaning of the skin is neglected: the pores become clogged, as it were, and the functions of the skin cease to be performed with sufficient regularity.

The exudations from the skin and the oily secretions of the sebaceous glands, together with the dead particles of the scarfskin, mingle with the dirt and dust floating in the air to form an incrustation more or less thick, which closes up the outer openings or pores and thus hinders perspiration, besides causing bad odors due to putrefaction of the mixture, and sometimes inducing inflammation or boils on the skin, or becoming the seat of baccilli.

A part of the dirt crust is probably abrased and attaches to the underwear of persons, and is thus removed with the change of the linen, in the laundry. From this it is apparent that the less often a change of linen is accomplished, the oftener a bath should be taken. It is, however, unfortunately true, that where underclothing is not removed sufficiently often, ablutions are also seldom indulged in. Our skin can only perform its function well if it is kept clean and free from all putrefactive accumulations. This is acomplished by a liberal use of warm water and soap. Warm water dissolves dirt much quicker and better than cold water, therefore a warm bath is required to clean the skin and to remove the used-up particles of the scarfskin. The alkalies of soap help to dissolve and remove the greasy or fatty substances, forming part of the dirt crust. The combined chemical and mechanical effects of water, soap and friction are needed to remove the mixture of dirt, skin secretions and epidermic scales on the skin surface, to prevent the clogging of the pores, and to promote the proper performance of the functions of the skin.

It is evident, then, that the good influence which bathing exercises upon the health of the body is exerted, first on the skin itself, and then through it upon the tissues and vital organs of the body. The care of the skin and cleanliness of the body are seldom spontaneous, they must be taught like all other things. Many persons are too lazy to use soap and water, brush and comb, and the entire ablution of the body is not accomplished with sufficient regularity. According to Professor Liebig, the true degree of civilization of a people may be judged by the amount of soap (and let me add water) consumed annually. The enjoyment of regular complete cleansing of the body should be afforded to all classes of the population. It does not cost much to keep clean, and there is no good reason why the poor man should not be enabled to maintain cleanliness as well as the rich.

Indeed, the laboring man is, owing to the nature of his work and to the increased perspiratory action of the skin due to muscular exercise, often in the midst of dirty surroundings, much more subject to dirt contamination, and therefore he requires, if anything, a more frequent change of underclothing, and likewise more facilities for bodily ablutions.

I shall again point this out and discuss the needs of the laboring man later on in speaking of people's baths, baths in tenement houses and those in factories. (See Chapter IX.) That we are far from having reached anything like perfection in this respect is sufficiently attested by the common condition of the air in tenements, in lodging houses, in street and elevated railroad cars, and on ferry boats, in schoolrooms, theaters, and places of worship. The organic emanations due to malodorous clothing or bedding are everywhere painfully apparent. It is, in fact, a matter of doubt what causes the largest amount of air pollution in a hall crowded with human beings, whether the products of combustion of illuminants and fuel for heat, or those of respiration, or finally, those due to the perspiration and the action of the skin!

CHAPTER III

THE DIFFERENT FORMS OF BATHS

HAVING explained in the last chapter the different objects of bathing, and the functions of the skin, which was necessary in order to obtain a thorough understanding of one of the chief objects of bathing, I will now briefly review the different kinds, types and forms of baths and of bathing appliances.

Baths may be classified as follows:

(*a*) According to the medium in which the body is immersed, or which is applied to the body.
(*b*) According to the temperature of the medium.
(*c*) According to the object of the bath.
(*d*) According to the form of the bathing appliance, the manner of application and the parts bathed.
(*e*) According to the location of the baths.

A. As regards the *substances* used for bathing the body or parts of the same, the most universally used medium is ordinary water, which may be either fresh or salt; next in frequency are hot air and the vapor of steam. One or more of these agencies are employed in baths taken for their cleansing effect, as well as in all baths taken for the sake of the general care of the body, or for healthful exercise. The use of other media is almost entirely restricted to medical baths, and includes not only water charged with salts, or with metals or gases, such as the various mineral spring waters, but also oil, mud, sand, brine, sunlight, air, electric light and electric currents.

The water supply required for baths is discussed further in Chapter XVII.

B. According to the *temperature*, we can distinguish in a general way between *warm* baths, *cold* baths, and general baths of an *average temperature*, which are neither hot nor cold.

To the latter belong the great mass of baths taken for the sake of their cleaning action, or for the purpose of obtaining a mildly exhilarating effect.

The cold bath is taken for the sake of refreshment, to cool off by drawing out the heat from the body, to increase the blood circulation, and, after a warm bath, to prevent catching cold, as the cold water causes the pores to contract and to close up.

Warm baths, on the other hand, are taken to soothe local pain, such as rheumatism, or to promote exudation, and sometimes for cleanliness; they often have a slightly weakening or debilitating effect upon the system.

Between these three kinds lie a great many varieties, such as the excessively cold, the cold, the moderately cool, the slightly cool, the tepid, the warm and the hot baths.*

In order to be more specific as regards the degrees of temperature of these respective varieties of baths, I give herewith the following statement:

Excessively cold	40 to 50°	Fahr.
Cold	50 to 60°	"
Moderately cool	60 to 70°	"
Slightly cool	70 to 80°	"
Tepid	80 to 95°	"
Warm	95 to 105°	"
Hot	105 to 120°	"

Higher temperatures than those given occur only in the Turkish and Russian baths, where the heat sometimes reaches from 130° to 200° Fahrenheit.

The usual means for heating the water for various baths are discussed in Chapter XVII.

C. According to their *purpose*, baths, as I have already mentioned, are divided in a general way in baths taken for cleansing, refreshment, exercise and preservation of health, or prevention of disease.

Baths for cleansing comprise warm and cold tub baths, tepid douches, showers and sprays, rain baths, sitz baths, hip baths, and foot baths.

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* Regarding the hot baths of the Japanese see the Appendix.

Baths for refreshing, hardening and cooling the body, and for the general maintenance of health comprise cold ablutions, sponge baths, river, lake and sea baths, and Turkish baths.

Baths for bodily exercise are taken in swimming pools of large bath houses, and during the summer time at the river, lake, seashore, and in surf baths.

Curative, therapeutic or medical baths comprise a great number of varieties. Some of these are artificial medicated baths, taken in a liquid or vapor, designed to produce a curative effect by virtue of some medical medium used with the water or vapor. Of others I mention: air and sunlight baths, Russian and Turkish vapor baths, mud baths, sand and oil baths, pine-needle baths, sulphur and brine baths, mineral spring baths, hot spring baths or thermal baths, electric and galvanic baths, massage baths, hydropathic baths, comprising wet sheet packs, sitz and hip baths, ascending, descending and side douches, or combinations of these.

The Russian bath is a kind of bath much employed in Russia, and introduced from there to other countries. It resembles in principle the ancient Turkish baths, but differs from the latter in that the subject, after the exposure to the influence of very hot vapor, with the attendant kneading, bathing, etc., is suddenly and violently cooled by means of a jet of ice-cold water.

The Turkish bath is a bath introduced from the East, in which the subject, after having undergone copious perspiration in a heated room, is subjected to various processes, as soaping, washing, kneading, shampooing, and ultimately proceeds to an outer apartment, where he is placed on a couch to cool off gradually.

The physiological effect of baths upon persons depends upon a number of factors, such as the mode and frequency of application, the temperature of the bath, the duration of same, etc. In some baths the tonic and stimulating effect is marked, others have a distinct soothing and sedative effect; others, again, are administered for their sudorific and sweat-producing effects, or for their beneficial action in drawing out heat and reducing the temperature; finally, in many baths the desired effect is simply cleanliness.

D. Baths may be classified according to the *kind and shape of the bathing appliance*, according to the parts of the body bathed, and according to the manner of application of the water.

According to the shape and dimensions of the bathing fixture, we distinguish in a general way between *single* and *common* baths. Single baths include the tub baths, sponge baths, douches, needle baths and showers; common baths include small swimming pools, or piscinæ, large swimming baths, river and sea baths, and the air and sun, vapor and hot-air baths.

Some of the forms of the common baths are more or less open to the objection of a possible contagion of the bathers, though the larger the bathing appliance is, and the more frequently its water is changed, the less danger exists of contamination or skin disease.

According to the parts of the body immersed or bathed, we distinguish between full baths, half baths, foot baths, hip and sitz baths, arm, eye and bidet baths.

A third subdivision naturally arises by considering the various appliances or fixtures by means of which a bath is taken. In some baths water is simply poured over the body, as in sponge baths, douche and needle baths, and in rain baths; in other baths or bathing appliances the entire body, except the head, is immersed in water. This, in a broader sense, includes the plunge bath, the swimming pool, and the river and sea baths. In a restricted sense it includes only those appliances, called bathtubs, in which the bather sits or lies down, but cannot otherwise alter his position.

The simplest form of bath consists in the ablution of the whole body with cold or tepid water by means of a sponge. This is the ordinary, so-called *sponge bath*, and where other bathing facilities are lacking, this should be taken daily. Many persons, however, restrict the daily ablution to the exposed parts of the body, viz., the face and the hands, while other parts of the body receive a washing only at rare intervals. The wet sponge should be applied to face, neck and bust; to the arm pits, arms and hands; and also to the groins and the feet, where the skin perspires more freely. In another form of sponge bath the bather stands in a large shallow tub, and water is poured over his entire body, generally from a large sponge.

Showers, Douches and Sprays — Water may be applied to the body, either for refreshment or for cleansing, by means of douches, showers and sprays. The spray may be descending, ascending or coming from the side, and it also has different names according to the part of the body to which it is applied.

The words "douche" and "shower" are often used indiscriminately, but in order to be correct, one should distinguish between them. A douche consists of a compact, solid, descending stream of water of varying size and force, whereas in the shower or spray the water issues through numerous small apertures, in a more or less finely divided stream, under a moderate pressure, and from either a sprinkler-shaped or a ring-shaped shower.

The douche is very intense in action and is not used to any great extent in ordinary bathing, but on account of its frictional impulse it is much used in hydrotherapeutic baths.

The ordinary spray or shower is very popular with bathers, and there are not only head showers, but also side sprays and upward jets. In the so-called needle bath we find a combination of all these, applied in minute jets to the whole body by a series of vertical and horizontal perforated ring tubes.

The showers are either fixed showers or else hand sprays operated by the bather or by the attendants. The overhead shower may be fixed so as to give a vertical descending stream of water, or more frequently nowadays it is placed inclined, so as to prevent the water from striking the head of the bather.

This last special form of shower is commonly designated as the "*rain bath*" and owing to its importance it will receive separate discussion hereafter, and we shall learn that it is the best form of cleansing bath for the masses. (See Chapter IV.)

All of the appliances mentioned are generally arranged to supply either warm or cold water to the body, but very often the shower is merely fitted up with cold water, in connection with a tub bath, taken for cleansing purposes, it being a good practice to end a warm bath with a moderately cold shower, which closes the pores of the skin and thus prevents the person bathing from catching cold.

A modification of the shower or douche, in which hot and cold water are used alternately, is called the "Scotch" douche.

Bathtubs — Bathtubs, or tubs to bathe in, are movable receptacles or else permanently fixed or stationary plumbing fixtures, of sufficient length and width and of proper shape to enable a person to immerse the body in water, for washing and bathing purposes. Generally, the tubs are provided with waste and overflow pipes, hot and cold supply pipes, plug and chain or waste valve, and single or combination bibbs.

Bathtub fixtures are either set directly on the floor, or they are raised on legs, blocks or cradles, or else they are sunk into the floor. In a bathtub the bather sits erect, or reclines, but he cannot move about as in the larger bathing pools.

The maintenance of cleanliness of tubs and hygienic considerations generally require that their interior surface be of smooth and non-absorbent material, and that they have all the corners well rounded. The rougher the surface of a tub, the more difficult it is to remove dirt and soap.

There are a great many varieties of bathtubs, differing in shape, size and material. We have already mentioned the full tubs, in which the body may be immersed up to the neck, and special forms intended for the bathing of parts only of the body, such as the sitz bath, the bidet, the foot bath and others. To these belong also the cleansing tubs arranged in modern swimming baths so that bathers may take a thorough ablution with soap and warm water before they are permitted to enter the swimming pool. (See under swimming baths.)

Historically interesting are the fine tubs of the Romans, which were cut out of a single block of polished granite or marble. Some of the French kings had placed in their palaces marble baths of great splendor. In taking a bath in these tubs it was usual to place in the tub a linen sheet, as the sides were cold and hot water was not very abundant at that time; this custom has remained in France up to the present day.

The marble tubs were not only cold to bathe in, but they were quite expensive, and later on tubs were made of wood and of metal. The French furniture makers of past centuries designed some curious varieties known as "sofa baths," of which Fig. 1 shows an illustration.

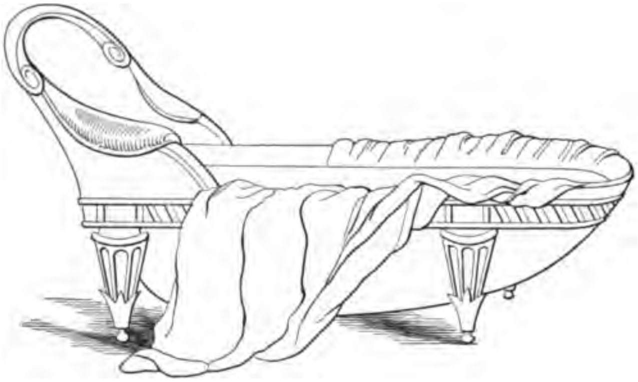

FIG. 1. SOFA BATH.

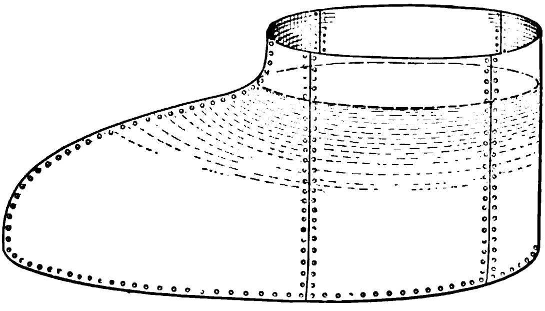

FIG. 2. SLIPPER BATH.

Another very quaint and out-of-date form of bathtub was the so-called "slipper bath," see Fig. 2. It consisted of a tub in shape very much like a shoe, which was partly covered at the top. In such a tub the bather sat in an erect position, and the object of the covering was not only to protect the bather, but also to prevent the spilling of water, and it enabled a person to take a "soaking bath," as required by some medical practitioners. Such slipper baths may at this day be seen in the southern part of France. Benjamin Franklin is said to have taken such slipper baths. "Franklin differed from his own generation in not dreading water. Not merely did he approve of water internally, but externally as well. Swimming, he maintained, was one of the most healthful and agreeable exercises in the world. He also claimed that a warm bath, by cleansing and purifying the skin, was found very salutary. In the year 1778, when suffering from a cutaneous trouble, he took a hot bath twice a week, two hours at a time, with the utmost benefit. In the last years of his life, when suffering from a complication of maladies, he used a warm bath every day in a bathing vessel said to be a curiosity. It was of copper, in the form of a slipper. He sat in the heel, and his legs went into the vamp; on the instep he had a place to fix his books, and in this bath he sat and enjoyed himself. Would it not be a capital subject for a historical painting — the doctor placed at the head of the Council Board in his bathing slipper?" (Quoted from Paul Leicester Ford's Essay on "The Many-sided Franklin," The Century Co., 1898.)

At the present day the term "slipper bath" is quite commonly used in England to designate the tub baths of the public bath houses.

The older patterns of bathtubs had the sides tapering both in plan and from the top downwards, but all modern, so-called French shape tubs have parallel sides, and afford considerable more room to the bather. The head end of the tub is made semi-circular in plan and sloped; but sometimes both ends are sloped and built symmetrical as in the so-called Roman-shaped tubs. The length of bathtubs varies from 4½ to 6½ feet, the width varies from 22 to 32 inches, and according to the inside depth of water the tub is either a shallow tub or a deep tub. The latter form is preferred for tubs on board of steamships, for obvious reasons.

There are also bathtubs made of odd shapes, some having a raised seat at the head end of the tub, others having the head end enlarged to a circle for the purpose of affording plenty of room for stout people.

Bathtubs are manufactured of a variety of materials. Wooden tubs are but rarely used, except for certain medical baths where the water is charged with salts or minerals, for instance sulphur baths, also for galvanic baths. While wooden tubs are cheap, they do not last long and soon become leaky when alternately wet and dry. Wood also absorbs filth, and when kept wet it soon rots away.

Cheaper metal tubs are made of zinc, whereas the better class of tubs are made of the more expensive copper metal. The usual American so-called "copper tubs" are really wooden boxes lined with varying weights of tinned and planished copper sheets, whereas English and Continental copper tubs are heavy metal tubs, standing free and therefore requiring no wooden casing for support. Copper tubs are made sometimes from polished red metal sheets, but more often the copper is tinned, or sometimes nickel-plated. After some use copper and zinc tubs may be made to look quite inviting by painting the inside with a special bath enamel paint. In England japanned enameled copper tubs are sold in which the enamel is put on in a similar way to the enamel of the American iron tubs.

Cast-iron bathtubs may be either painted, galvanized or porcelain-enameled. The latter process has now reached a high degree of perfection, and enameled iron tubs are now obtainable which are in appearance and general durability nearly equal to the more expensive soild porcelain tubs. Formerly iron bathtubs were provided with a polished wooden top rim, but nowadays tubs are exclusively used which have a glazed roll rim, thus doing away entirely with all surrounding or encasing woodwork, and standing free on the tiled or cemented floor.

A modification of the metal tub is the "steel-clad" bathtub, consisting of a shell of steel lined with planished tinned copper. Bathtubs were also, for a short time, manufactured of indurated fiber, and painted on the inside with a special enamel, but they were not found durable. Tubs have also been manufactured of cast aluminum.

The modern fine glazed porcelain or fire clay tubs are very solid, durable and absolutely clean and sanitary. Formerly such luxurious tubs were made in England exclusively, but since a few years the American potteries have taken up the manufacture of solid porcelain ware and turn out goods comparing very favorably with the imported bathtubs.

Porcelain tubs require much more hot water than copper tubs, and this difference is often quite appreciably felt in private houses, where the hot-water supply comes from the kitchen boiler. It has, accordingly, become customary to provide a larger special hot-water tank, heated by a special hot-water heater. In large bathing establishments, where the tubs are in more or less continuous use, and hence do not become chilled during the intervals between bathing, this is not so noticeable.

Solid porcelain bathtubs were formerly finished on the top edge either with a polished hardwood or with a marble capping, but the modern tubs always have glazed roll rims. They either stand free or are keyed into the tiled wall.

Other varieties of bathtubs are the tile-lined tubs and those lined with marble or slate, but they have the drawback that the joints may leak, and that much dirt collects in the square corners and in the numerous joints.

Occasionally marble and granite stone tubs are used, which are cut out of a solid block of stone, but they are very expensive, clumsy and heavy, and nothing really can compare in cleanliness and sanitary qualities with the solid glazed porcelain tub.

Much use is made in German hospitals of tubs manufactured of annealed glass, which seem to have proven durable and sanitary.

A special form of bathing appliance, much advertised abroad, and used in some houses on the Continent, but not as a stationary fixture, or connected with the plumbing pipes is the so-called "wave bath" (Wellen oder Schaukel-Bad), Fig. 3, which by the motion of the bather causes the water to impart to the body a feeling similar to that of the waves in the ocean surf bath. (See Chapter XVI, Fig. 113 a and b.) The advantage is claimed for these forms of baths that water in motion acts more exhilarating than quiet water.

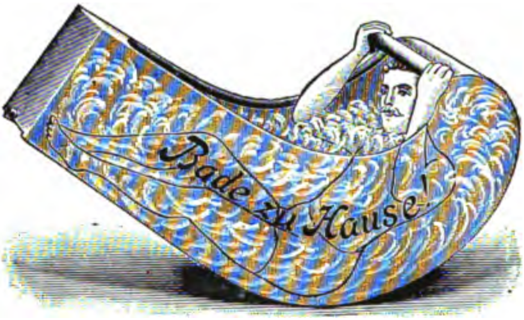
Bade zu Hause!

FIG. 3. PORTABLE WAVE BATH.

Originally such a "mechanical" bathtub was the invention of a certain French nobleman. In recent years a somewhat similar device has been manufactured in Germany (see Fig. 4),

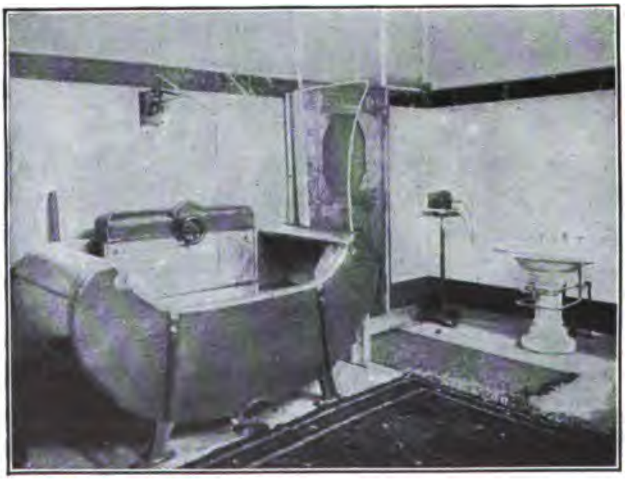

FIG. 4. MECHANICAL WAVE BATH.

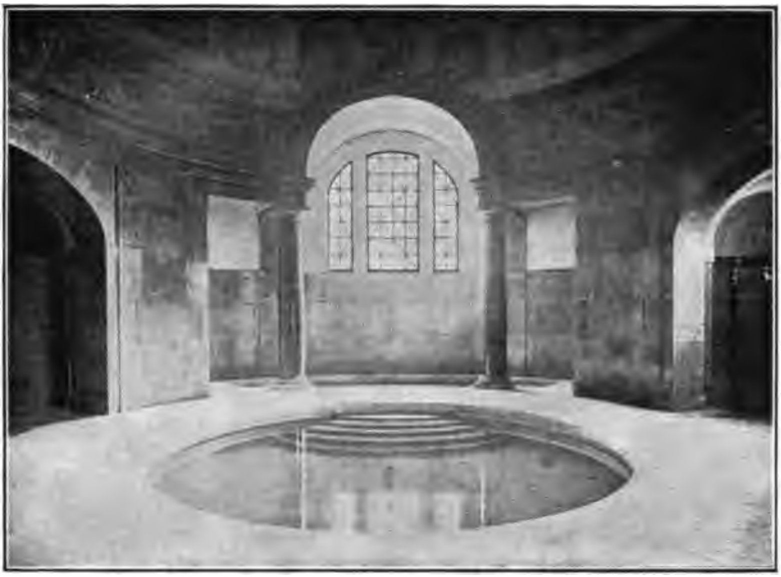

Fig. 5. View of Plunge Bath.

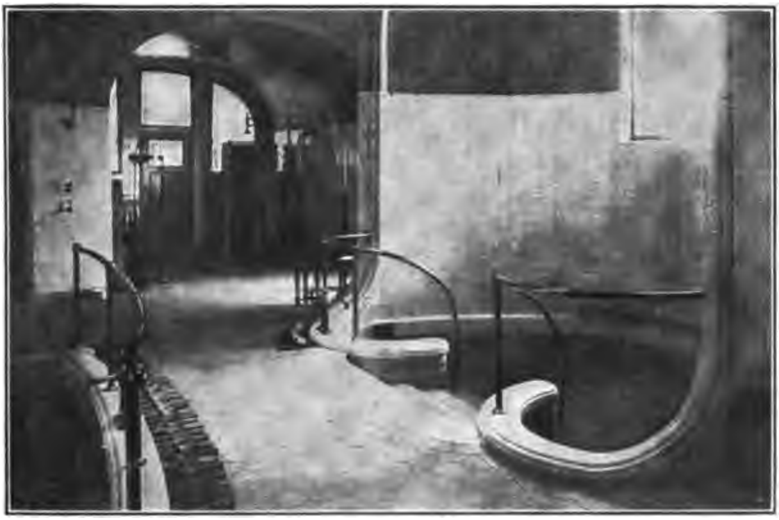

Fig. 6. View of Plunge.

in which, however, the wave motion is effected by special mechanical means. (See also Chapter XVI.)

Bathing Pools, Plunges or "Piscinæ" — During the Middle Ages bathtubs consisted often of larger pools called "piscinæ," which were either oblong or round in shape, and which were sunk into the floor, and entered by means of one or more steps. They were sometimes built in marble or granite, and two or sometimes several persons bathed in them simultaneously. Similar modern pools or plunges are used in some of the medical baths of Europe, and are built of brick or cement masonry and lined with tiles or marble. In Turkish baths there is often provided a kind of plunge bath for cooling off the body after sweating. (See Figs. 5 and 6.)

Such bathing pools form the intermediate step between bathtubs and the larger swimming pools.

Immersion pools are also found in the Baptist churches, and in some of the older synagogues purifying baths for the women in the form of pools were built in conformity with religious requirements.

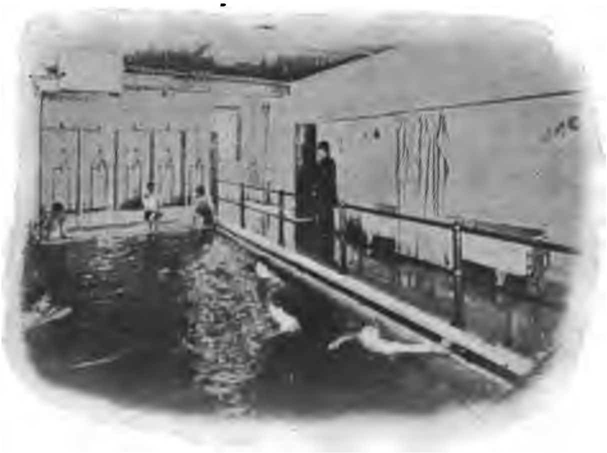

Fig. 7. A Swimming Bath.

Swimming Baths — Swimming baths (Fig. 7) are natural or artificial pools, tanks or basins, either open or covered, and filled with water, intended for congregate bathing, particularly, though not exclusively, for swimmers.

Swimming baths are of two kinds, viz.:

(1) Those, erected in rivers, lakes or at the seashore, which being open and unprotected are available only during the warm season of the year. (See Chapter XIV.)

(2) Artificial pools, basins or tanks, generally located in covered structures, in which the water is usually moderately warmed during the cold season, so as to enable them to be kept open and used the year round. (See Chapter VI.)

Both kinds of swimming baths are not intended for cleansing purposes, but are adapted only for pleasurable and healthful muscular exercise of body and limbs. Their object is rather to maintain or improve health by hardening the body. Incidentally they offer amusement and recreation, and the open-air swimming baths, in particular, serve in summer time for cooling off and for the refreshing of the body.

It is an indisputable fact that in the summer, and particularly during heated terms, people take a bath in the river or at the seashore, not from a desire to become clean, but for the sake of enjoying the practice of swimming, or for the cooling, invigorating and exhilarating effect of such a bath. The tonic effect of river and ocean baths is largely due to the strong impact of the water in motion (currents, waves, surf), which is much more exhilarating than quiet water, and advantages incidental to them are the breathing of pure air and ozone at the seaside. Whatever cleanliness of the body may be attained in a river or ocean bath is merely accidental and concomitant.

In the same way the swimming pools or basins in the public and the Turkish bath establishments are not, in any sense, intended as cleansing baths, and the use of soap in them should never be permitted. They, therefore, require the provision of special foot baths and showers, where all bathers, *without* *exception*, must take a cleansing bath before they are permitted to enter the plunge. Even when this precaution is observed, each bather helps to a certain extent to pollute the water,* and unless the supply is continually and constantly changed, the water is liable to become contaminated. From time to time it is, therefore, advisable to empty the entire contents of the pool in order to clean the sides and the bottom of the basin. For these reasons swimming baths require a very large supply of water, and they are in every respect expensive to maintain.

However excellent the plan may be of establishing people's rain baths for personal cleanliness and hygiene, it is well to recognize also the need of well-arranged swimming baths for pleasure and general health in large cities, particularly where floating baths on the river front are objectionable because of the discharge of sewage near their location. (See Chapter VIII.)

In this respect even small European cities are far better off than the large American cities.

Vapor and Steam Baths — In hot dry air, vapor and steam baths, or so-called Russian (Fig. 8) and Turkish baths, the bather is surrounded by moist air of 104° to 132° Fahr., and in the Turkish bath by dry air of a high temperature (from 140° to 200° Fahr.). This opens up the pores of the skin and causes it to perspire profusely, and in this way secures a thorough cleanliness of the body. These baths are followed and assisted by shampooing, kneading the skin, spraying, and terminate with a thorough drying, dry rubbing or with massage and rest.

Such baths are outside of the object of this book and therefore cannot be discussed in detail.

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* Where a large number of bathers bathe simultaneously in swimming basins, it is best to have fresh water flowing into them continuously, and not to arrange the warm-water supply on the circulation system. Stagnation of water in any swimming pool renders it less inviting, and is certain to create ultimately unsanitary conditions. In open river and sea baths, water is constantly changed owing to the motion of the water (currents, tides, waves), and in artificial tanks a like change of the water must be artificially provided to guard against the danger of propagation of skin or eye diseases.

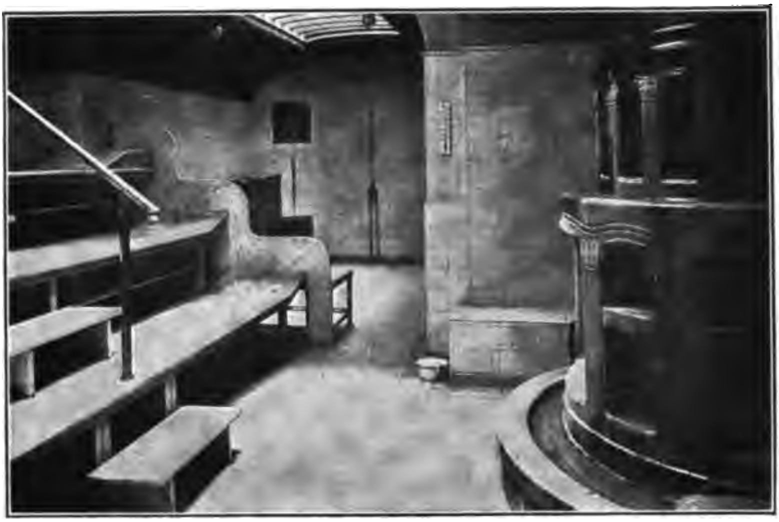

FIG. 8. VIEW IN TURKISH BATH, IN GUENTZBATH, DRESDEN.

E. According to their *location* we may, finally, distinguish between

(1) Baths in private houses;
(2) Baths in tenement houses;
(3) Public bath houses;
(4) People's baths;
(5) Baths in factories and industrial establishments;
(6) School baths;
(7) Baths in military barracks, jails, prisons;
(8) Hospital baths;
(9) Baths attached to gymnasia and clubhouses;
(10) Hotel and barber-shop baths;
(11) River baths;
(12) Sea and surf baths;
(13) Air and sun baths;
and (14) mineral spring, curative and therapeutic baths.

Many of these baths will be referred to in further chapters.

CHAPTER IV

THE MODERN RAIN BATH *

THE rain bath is the most important form of cleansing bath, from a hygienic point of view, hence is deserving of special attention. Since the first introduction, about the year 1883, of the so-called "rain baths" in Germany, I have followed with keen interest and close attention the gradual development and rapid spread of this new system of baths. It was, later on, my good fortune to become connected with the planning and construction of many of the earlier rain baths installed in this country.

The form of shower or spray which is used in the rain bath is not, in itself, new, for it has long been used in connection with the common bathtub, and it has also been used separately in isolated cases, for instance, as an adjunct to swimming and Turkish baths, or in gymnasia and athletic clubhouses.

In the modern "rain bath" system, however, as recently extensively advocated and applied, *tubs are entirely abolished*, simple spray or shower baths being substituted for the same, and being installed in the bath compartments as a distinct and independent form of bath. While such a rain bath can, of course, also be used in bathrooms of private houses (see Fig. 14, Chapter V), it is for public baths, baths in hospitals and other institutions, for manufacturing establishments, for schools, and for people's baths that the rain bath is specially adapted.

One feature of construction, which is novel and of much importance, is that *the shower or spray is placed at an inclined angle* in the rain bath, the object being to avoid a vertical stream from the shower striking the head of the bather, which to many persons is quite disagreeable. In the new form of rain bath the bather stands erect under the shower, which is inclined in such a way

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* Reprinted from the *American Architect* of February, 1894.

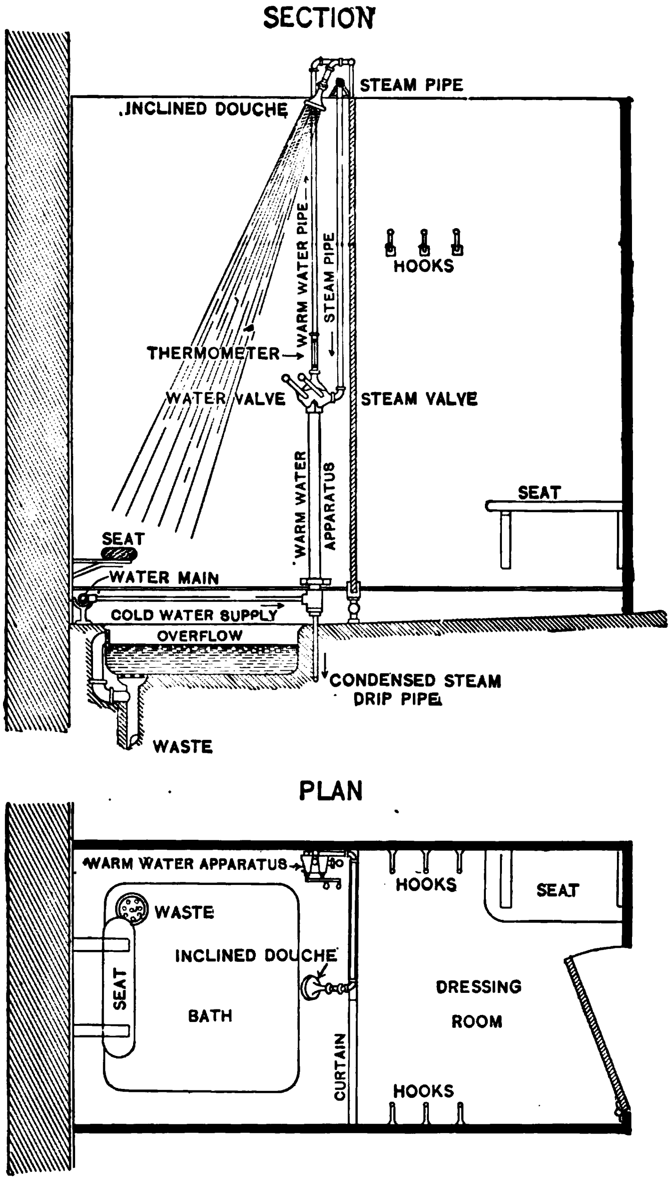
SECTION
STEAM PIPE
INCLINED DOUCHE
WARM WATER PIPE
STEAM PIPE
HOOKS
THERMOMETER
WATER VALVE
STEAM VALVE
WARM WATER
APPARATUS
SEAT
SEAT
WATER MAIN
COLD WATER SUPPLY
OVERFLOW
CONDENSED STEAM
DRIP PIPE
WASTE
PLAN
WARM WATER APPARATUS
HOOKS
SEAT
WASTE
INCLINED DOUCHE
SEAT
BATH
DRESSING
ROOM
CURTAIN
HOOKS

FIG. 9. PLAN AND SECTION OF RAIN BATH COMPARTMENT.

that the lukewarm water strikes the body only from the neck downwards (see Fig. 9, and also Fig. 26b, Chapter VII), and the head is not wetted, except when the bather purposely places the same under the descending shower of water.

The advocates of this novel method of bath construction claim the following chief advantages for it as against bath houses fitted up with the usual forms of bathtubs:

(1) The first outlay for construction is considerably reduced, because the sprays are cheaper than bathtubs. Likewise are the running expenses for maintenance and repairs reduced, because the apparatus is simple and not liable to get out of order, because sprays last longer than copper or enameled iron bathtubs, and because repairs, if needed, are not considerable in extent.

(2) In public bathing establishments the shower or rain bath system is much more economical in management than the tub system, for the spray or shower bath is always ready for use and requires but very little attendance. No time is lost as in the filling of the ordinary bathtubs, and in the subsequent emptying, cleansing and scrubbing of the sides of the tub after each bath.

(3) The spray or rain bath, while more efficient, consumes less time in application, consequently a larger number of people can take baths in a given time than where bathing is carried on in tubs.

(4) The rain bath requires less space in the planning of a bath house as compared with the same building when fitted up with bathtubs. In other words, more bathers can be accommodated in a given space.

(4) *The body of a person using a rain bath does not come at all in contact with soiled water*, as is the case in bathing in the ordinary bathtub, for in the rain bath the water from the spray passes away as waste water through an outlet in the floor about as fast as it is

delivered. This is one of the leading arguments in favor of the new method, and it is of particular importance in the case of baths for workingmen or factory employees, of baths for school children, and of people's baths in tenement districts. (See subsequent chapters.)

(6) The mechanical and tonic effect of the descending stream in the rain bath is superior to the tub bath, both in thoroughly cleansing the body and producing a stimulating effect and good hygienic results, whereas a bath taken in a common bathtub, instead of refreshing the body, often has a debilitating effect.

(7) The rain bath requires somewhat less water than a tub bath, which consideration is of importance where water is given to consumers by meter measurement. This is generally the case in public baths and public institutions. The exact proportion between the amount used in a bathtub and the amount needed for a rain bath differs according to the construction, the number and the size of the perforations of the shower head, the available water pressure and the length of time during which the shower is kept running. The saving of water as quoted by Dr. Lassar and others appears to me, however, to be somewhat exaggerated. Experiments by actual meter measurement, carried out by me at the Demilt Dispensary, showed that whereas the tub bath (a short French-shaped enameled iron tub) required about 45 U.S. gallons, the rain bath, with an ordinary shower kept running for three minutes, required about 22½ gallons (7½ gallons per minute), or in other words about one-half the amount required for a tub bath. The above allowance is, in reality, too generous, and good results are obtained with sprays running from 2½ to 5 gallons. Three minutes for each bather is the time allowed in the case of military barracks in Germany; a workman or me-

chanic would in all probability, require the shower to run somewhat longer to effect a thorough cleansing of the body, hands and face after his work.*

(8) Compared with the swimming baths, the rain bath affords a greater degree of privacy, and it can be used both in summer and in winter, whereas the free swimming baths of many cities are only available during the summer season.

(9) Finally, the danger of communicating disease is somewhat reduced, because no impure, infectious or contagious matter is left in the rain bath, as may easily happen where the bath attendant is either hasty or careless in the cleansing of the tub.

* * * * * * *

What appears to have been the first rain bath was constructed as early as 1857, by Dr. Duval, in a military barrack at Marseilles.

Dr. Alexander Bresgen, surgeon in the Prussian Army, in a pamphlet on baths, published in Germany in 1871, was the first to advocate the general introduction of rain baths instead of tub baths for all public institutions, enumerating in particular military barracks, prisons, hospitals and factories. Attached to his pamphlet is a plan of an octagonal bath house with sixteen bathing apartments with overhead inclined douches, in which he figures 120 soldiers can bathe in one hour.

The celebrated French engineer and architect, Tollêt, in a pamphlet published in 1877, and entitled "La Reforme du Casernement et les Bains-douche," Paris, 1877, submitted plans for three types of rain baths, suitable for military needs.

In the Revue d'Hygiène for 1879, Monsieur Vallin describes a primitive form of rain bath used in an asylum for homeless women and children in Paris.

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* I find that shower-heads, such as are largely used in German rain baths, are considerably smaller in diameter, have a lesser number of holes, and holes of smaller diameter than used here. These showers run on an average from 2½ to 3 gallons of water per minute, with a water pressure of from 25 to 40 pounds per square inch.

The first progress toward the general use of rain baths was made in the case of military barracks and of prisons. At the suggestion of Dr. Munnich, surgeon-in-chief of the regiment, rain baths were installed in 1879 in the armory of the Emperor Franz Joseph Regiment of the Guards in Berlin, the aim being to bathe quickly a large number of soldiers. Similar baths were fitted up in the armory of the Infantry Regiment Prince George in Dresden, where twenty-four soldiers could bathe at one time in a large bathroom, also for a cavalry regiment of the Imperial Guards at Potsdam. In 1881 the military barracks of the First Bavarian Infantry Regiment at Munich were furnished with rain baths. The well-known military school at St. Cyr, France, was also equipped with such baths.

In Pettenkofer's "Handbook of Hygiene," published in 1882, Professor Dr. Schuster, writing about military barracks, states that experiments with tub baths for soldiers did not prove successful: first, because the tubs are expensive; second, because of the large quantity of warm water required; and third, because the time occupied in bathing is too great. His conclusion is that the spray or rain bath is much more adapted to the needs of the military service.

Again, for bathing in prisons, jails, workhouses and houses of correction, Dr. A. Baer, of Berlin, recommended in 1882, in the same handbook, the spray or rain bath in preference to tub baths. He describes a prison or jail in the City of Muenster which has eight bathing compartments fitted up with douches, enabling the bathing of nearly 300 prisoners in four hours.

In the prison of Rouen, Dr. Merry-Delabost installed a large rain bath, capable of bathing 900 to 1,200 prisoners in two days.

The credit of having first advocated the use of the rain bath for people's or public baths belongs to Prof. Dr. Oscar Lassar, who exhibited at the Hygienic Exhibition at Berlin, in 1883, the first people's rain bath, the construction and equipment of which was carried out by the well-known firm of David Grove & Co., of Berlin.

The Berlin Health Exhibition in 1883, therefore, may be said to have given the first impulse to a more general introduction of this new form of bath, and Dr. Lassar ever since has been the champion advocate of public rain baths in Germany. The matter received renewed vigor and impetus by the Berlin Exhibition for the Prevention of Accidents, in 1889, when a special committee arranged for a competition, and drew up a programme for the proper construction and installation of workingmen's baths on the "rain bath" principle.

People's rain baths were built and constructed in Vienna in 1887, in Berlin, Frankfort and Magdeburg in 1888, in Munich and Hannover in 1889, in Altona, Breslau, Braunschweig, Mannheim and Mainz in 1890, in Würzburg in 1891, in Cologne, Düren and Mühlheim in 1892, in Leipsic in 1893, and they are at present constantly and rapidly multiplying throughout Germany, whereas we hear little or nothing of their use in England or other European countries.

Following the establishment of people's rain baths, a movement was inaugurated in Germany to provide cleansing baths for the children in public school buildings. Sanitarians are agreed that the practice of affording baths to the children in public schools does more to improve the air of classrooms than any system of artificial ventilation. Such school baths would prove a boon to the children of the tenement population in American cities.

To Professor Flügge and to Mayor Merkel of the university town of Göttingen belongs the credit of having advocated and introduced the first rain baths into the public schools of that city. In public schools, where cleanliness of the body is so intimately connected with the problem of schoolroom ventilation, such rain baths for the children have proven very successful, and the example of Göttingen was soon followed in other cities, notably Weimar, Sachsenhausen, Magdeburg, Karlsruhe, Mainz, Breslau, Frankfort and others too numerous to mention.

Rain baths were likewise soon erected or fitted up in a great many factories and manufacturing establishments, of which I will only mention the large steel works of Herr Friedrich Krupp, in Essen.

Neither bathtubs nor swimming tanks are adapted to the needs of workingmen in factories, and here again the tepid rain bath offers many advantages and can be cheaply procured, as manufacturing establishments generally have an abundance of waste or exhaust steam.

Even on board of steamships the rain bath has been found useful. I am informed that some of the ships of the German Navy, and likewise some of the fast passenger ocean steamers of the North German Lloyd, as well as other steamships, are fitted up with rain baths.

Quite recently rain baths were introduced into the United States, at the suggestion of a hydrotherapeutic physician, Dr. S. Baruch, of New York City, who had an opportunity to visit and inspect some of the European baths built on this principle.

The first small American rain bath was installed at the New York City Juvenile Asylum. Then followed the larger people's baths in Center Market Place, the public baths at the Demilt Dispensary, in the Hebrew Institute, and those erected by the Trustees of the Baron de Hirsch Fund at the corner of Henry and Market Streets in New York City. The plans and the construction of the three last-named baths were devised and superintended by the writer, associated with Messrs. Brunner & Tryon as architects. (See Chapter VII.) The writer also acted as consulting engineer for the rain baths erected in the Young Men's Christian Association building at Cedar Rapids, Iowa, designed by Josselyn & Taylor, architects, and for many of the more recent public baths in New York City.

In Scranton, Pa., the Pennsylvania Oral High School building was provided with rain baths from plans of Mr. Theophilus P. Chandler, Jr., of Philadelphia. The factory of J. H. Williams & Co., manufacturers of drop forgings, in South Brooklyn, near Hamilton Ferry, was recently fitted up by its owner with rain baths (although with vertical douches) for the employees.

The value of rain or spray baths is not confined to people's baths only. In hospitals for insane, where the bathing of patients in tubs formerly led to abuses and involved the danger of scalding patients, spray baths are now preferred. In all hospitals for insane of New York State bathtubs are abolished, and spray baths have been substituted. They are placed either in single stalls in the wards or in congregate bathrooms or bath houses, of which good examples may be seen at the Utica State Hospital and at the Long Island State Hospital at Kings Park, L.I.

The large bath house at the State Hospital for Insane at Utica, N.Y., was constructed, in 1894, from plans prepared by the writer, and under his superintendence.

In this country the rain bath is comparatively little known, except in some of the larger cities, but its advantages are so obvious that the writer feels confident in predicting a rapid and successful development of the new form of baths. Since the opening of the Baron de Hirsch Fund Baths, the writer has had numerous inquiries about rain baths from Philadelphia, Chicago, Boston, Cleveland and also from Southern cities.

It is sometimes argued that people's rain baths cannot become popular in the United States, because in all large cities, and even in the smaller towns, dwelling houses are rarely built without the convenience of a bathroom. This can hardly be considered a fair statement of the existing conditions. The actual facts in the case would appear to me to be as follows: It is true that the wealthy and the well-to-do classes have in their houses one or several bathrooms, fitted up with more or less luxury, and the better class of the population have, moreover, access to the many bathing establishments which charge a high price of admission, which only people in comfortable circumstances can afford to pay. On the other hand, it must not be overlooked that even in the houses of the well-to-do people proper provision is rarely made for servants' baths. Again, the middle classes who, in New York City, for instance, are largely compelled to live in flats or apartment houses (the higher-sounding name for improved tenement houses), have, with rare exceptions, only a narrow, dark and generally uninviting bathroom, and the mistake is, moreover, usually made by architects or builders of locating the water-closet almost invariably in the same room. But the poorer class of our population, including mechanics, salesmen, clerks, etc., have rarely any bathing facilities whatever, and there are thousands of tenement houses, especially in the densely populated districts of our large cities, which do not afford the convenience of a bath.

People's baths, therefore, would seem to me to be just as much needed here for health and cleanliness of the people as they are in Europe.

Rain baths, however, are not merely suitable for public or people's bath houses in populous districts. As their success in Europe has fully demonstrated, they are eminently adapted for many other classes of buildings, among which I will mention the following:

(1) Institutions, such as general hospitals, hospitals for the insane, hospitals for infectious diseases, orphan asylums, prisons, institutions for feeble-minded children, for the blind, etc.
(2) Gymnasiums, college buildings and clubhouses.
(3) Public schools.
(4) Factories and manufacturing establishments, breweries, central slaughter houses or abattoirs, etc.
(5) Military barracks and armories.
(6) Hotels.
(7) Railroad stations for railroad employees, in particular for the engineers and firemen, and the clerks of the railway mail service.
(8) Quarantine establishments.
(9) On board of merchant steamships, ocean steamers and men-of-war.

* * * * * * *

The general arrangement of rain baths as well as the details of construction vary, each case being a problem in itself. For whatever purpose they may be constructed, the baths should be tidy and neat, kept scrupulously clean and inviting in appearance, and well ventilated, heated and lighted. It will suffice to mention briefly a few of the more important features.

The main bathroom is sometimes divided into a dressing room and a separate room containing the showers, or else the dressing rooms are arranged in a row on one side of the room, whereas the apartments containing the sprays are placed on the opposite side. Such arrangement is preferred for schools, hospitals and military barracks.

In the case of people's baths it is preferred to combine the dressing room and the bath proper, separating the two only by means of a partition or a waterproof curtain. Each bath is generally four feet wide and four feet deep, whereas the dressing room is only four feet wide and from three to five feet deep. The floor of the bath may consist of concrete covered with a final coat of pure Portland cement, or else some artificial stone floor, such as is used for sidewalks, is laid. The floor may also consist of marble mosaic or vitrified tiling, or else of asphalt, which is more impervious to water than cement, and is more agreeable to the feet than a cement floor. The cement floor is often covered in the dressing room with a removable sectional wooden lattice or gridiron floor to keep the feet dry, but such wood soon rots and requires frequent renewal. In all cases the floor of the dressing room should be graded toward the bath compartment.

In many rain baths the floor of the bathing apartment is sunk or depressed, being molded in concrete in the form of a basin, from four to six inches deep with rounded corners. In order to make the basin hold a few inches of water, and thus answer for a foot bath, the number of holes in the strainer over the waste is properly adjusted so that the water does not flow away as fast as delivered by the shower, or else a standing overflow with trumpet-shaped mouth is easily arranged.

It is not easy to decide what material is best adapted for the upright partitions or divisions between the bathing compartments. A non-absorbent material, such as opaque and non-transparent glass, marble or slate would, of course, be best from a sanitary point of view, where economy is no object. The partitions may be covered with glazed tiles, and the walls may be tiled or faced with glazed or enameled brick. Often the divisions are made of corrugated iron, galvanized and afterwards painted with special bath enamel paint. The cheapest partitions are those of wood, if well filled and oil painted, and such I find are used in many of the people's baths in Germany, although they are undoubtedly inferior in point of cleanliness and durability to marble or slate. Sometimes marble divisions are used for the bath compartment and wooden divisions, painted with English white enamel paint, for the dressing rooms.

The partitions should not be less than seven feet in height, and it is advisable to keep the bottom of all partitions from ten to sixteen inches from the floor to facilitate cleaning operations and to promote the circulation of air.

The sprays or shower heads are made either of copper or of spun brass, and may be finished either by tinning or by nickel-plating. Copper showers are somewhat cheaper than brass, but they should be made very strong, and should have well-soldered joints where the pressure of water is heavy, otherwise it may happen that the facing will blow out. It is preferable to have the face of the shower fastened with screws or bolts, so as to have the same removable in case the holes become stopped up by impurities in the water. The number and size of the holes should be calculated and adjusted to the available water pressure so that the sprays will deliver from 2½ to 5 gallons of water per minute. In order to be able to vary the angle of the descending stream it is best to fasten the douches to the supply pipes by means of swivel joints. In order to enable each bather to control the shower, a strong self-closing cock with combination lever, chain and pull is inserted in the branch supplying each shower, and a hook is provided to fasten the chain to, in order to leave both hands of the bather free. Such cocks or shut-offs may, however, be dispensed with whenever a bath attendant controls the bathing apparatus, as in schools, military barracks and institutions.

The water-service pipes, which are generally carried exposed along the ceiling of the apartments, may be more or less complex in arrangement. Sometimes both hot and cold water pipes are provided and carried to each bath compartment, in which case each of the latter requires a separate mixing valve, generally fitted with a hot-water thermometer. As a rule, however, the warm water of a temperature suitable for bathing, and varying from 85° to 110° Fahr., is mixed at a central apparatus, and carried and distributed to the showers by a single warm-water main. The best mean temperature of the warm water at the shower is about 100° Fahr. Provision must be made for an abundant supply of water, by making the supply pipes amply large.

Likewise should the waste pipes from the bath be ample in size to carry off quickly all soiled water. The main drain should be laid with the greatest care, and wherever possible it is advisable to use a separate sewer for the bath house, where the same is located in a building having other plumbing work.

All plumbing should be durable and substantial, of the best of its kind, and perfect from a sanitary point of view. Good flushing-rim water-closets with flushing cisterns, well-flushed urinals, and a cleanly earthen or enameled iron slop sink should always be provided. Hose sill-cocks with rubber-lined hose, for flushing the floors and cleaning the bath house generally, must not be forgotten.

Where a general waiting-room is provided, its floor should be tiled, and provided with a safely trapped floor drain, with shut-off gate valve.

The bath house should be properly and comfortably heated and suitably ventilated. All bath compartments should be lighted by gas, or, better still, by incandescent electric lights.

The bathing compartments should be fitted with plain and substantial furniture, as follows: In the bath proper there should be a perforated brass or galvanized iron or cork seat, while the dressing room should have a well-fastened hardwood seat, generally quarter-circle in shape, a number of enameled iron clothes hooks, a towel rack, a cuspidore and an iron bootjack.

It is doubtful whether it is proper to provide comb and hairbrush in each dressing room, because by the promiscuous use of these toilet articles diseases of the hair or scalp may be communicated from one person to another.

Mirrors in bathing compartments generally become covered with watery vapor, and are thus rendered practically useless, and it is quite sufficient to provide one large mirror in the main vestibule or hall of the bath house.

The entrance from the waitingroom to the dressing room should have a light wooden lattice door, cut off at bottom and at the top so as to admit of plenty of air for circulation. A door between the dressing room and the bathroom proper is not needed; it generally suffices to put up a rubber curtain or a curtain of coarse cheese cloth to prevent the splashing of the douche and the wetting of the clothes of the bather. It should be mentioned that physicians are opposed to the use of curtains, as being liable to take up and retain germs.

A question of prime importance in the construction and fitting up of rain baths is the provision of a large quantity of warm water, and, at least in the case of public baths, their ultimate success may be said to hinge largely about this point.

In private houses an abundant supply of hot water for bathing is, as a rule, provided for by the water-back in the kitchen range in connection with the kitchen boiler or reservoir for hot water, or else by special hot-water tanks and heaters located in the basement or cellar. But for all large bathing establishments special means for warming the water are required, such as hot-water heaters, with coal or gas fire, or else closed boiler-iron tanks heated by steam coils, or special feed-water heaters. Sometimes the water is heated by the direct admixture of steam, but this is a method not to be commended.

Whatever the system may be, the warm-water apparatus to be successful should be simple, efficient and reliable; there should be no unnecessary loss of heat, and the water for baths should never become overheated, and thereby expose the bather to the danger of scalding.

In nearly all cases, where a larger number of rain baths are fitted up, whether in bathing houses, factories, institutions, schools, hotels, breweries or other buildings, a steam boiler plant is erected in the building for heating or power purposes, and steam is therefore available for the generation of warm water in the form of either high or low pressure steam, or else of exhaust steam. The ordinary hot-water tank, however, heated by a steam coil, is open to many objections, being unreliable and difficult to regulate, therefore wasteful in heat. The Tobey hot-water heater is constructed with a view of obviating this difficulty and is, to some extent, successful. The ordinary hot-water tank has been fitted up with an automatic attachment or thermostat regulating the supply of steam. Both devices are, however, expensive and somewhat complicated.

Quite recently a novel and ingenious form of apparatus for heating water by steam has been devised, which promises to work very successfully.

This is called a "Gegenstrom Apparat," and is now extensively used in Germany. It is invented and patented by Mr. Schaffstaedt, of Giessen, Germany.

The water is heated in this apparatus by means of high or low pressure, or by exhaust steam, and the apparatus derives its name from its special construction, it being so arranged that the cold water and steam travel in opposite directions ("Gegenstrom") without at all mixing together.

Fig. 10 shows a section and elevation of a small size of this heater. The cold water enters at (a) and travels upward in the direction of the arrow, while steam enters at (b) and travels downward, issuing in a condensed form at outlet (c), which may be connected with the return steam pipes. Pipe (d) carries the warm water to the shower (e), which is placed inclined at a proper height above the bather. The water and steam cocks are designated by letters (f) and (g), and a hot-water thermometer is placed at (h).

The object of the apparatus is to heat water instantaneously to any desired temperature by means of steam, without the latter

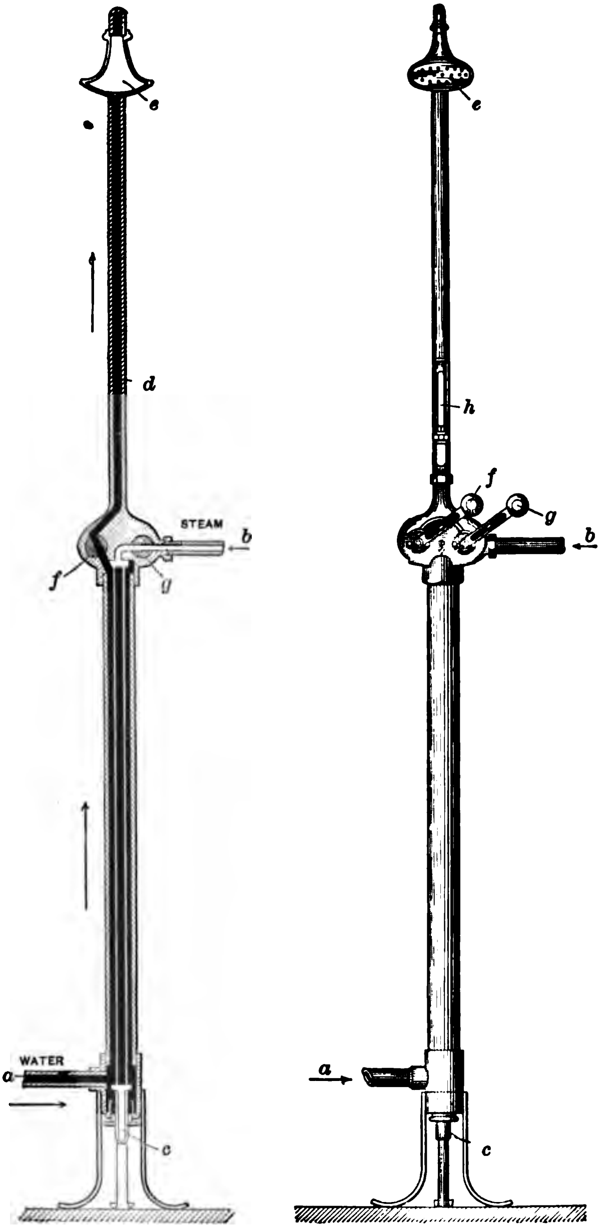

e
d
STEAM
b
f
g
WATER
a
c
e
h
f
g
b
a
c

Fig. 10. Section and View of Small "Gegenstrom" Hot Water Apparatus.

passing through the water. This it accomplishes thoroughly; the water is uniformly heated and the apparatus works without any noise whatever.

It is so simple and at the same time so efficient in construction, that the writer, with the approval of the medical superintendent of the Utica State Hospital, adopted and ordered for the new bath house four heaters, to be sent from Germany, each capable of supplying warm water for twelve douches, each discharging, on an average, about two and a half or three gallons per minute of warm water heated to 100° Fahr. These were the first "Gegenstrom" apparatus put in actual use in the United States. (See illustration, Fig. 86, Chapter XII.)

In this apparatus, as is clearly seen in the illustration, the water and steam valves are so arranged that it is impossible to turn on the steam without first turning on the water. Moreover, the amount of heating surface is so calculated and adjusted, in all apparatus constructed specially for bath purposes, that for a certain constant pressure and temperature of steam the temperature of the warm water will not exceed 110° Fahr., when all the showers, for which the apparatus is calculated, are running simultaneously.

All similar appliances for warming water by direct admixture of steam are open to the objection that it is impossible, owing to changes in water and steam pressure, to control exactly the temperature of the warm water. Sometimes the steam is not completely condensed, and, as a result, the bather may be scalded by particles of steam escaping with the water. Moreover, all mixing valves for steam and water cause more or less disagreeable noises, and often the water becomes impregnated with a peculiar odor, or else it is rendered somewhat impure by admixture of oil from the steam pipes. The chief advantages claimed for the "Gegenstrom" apparatus are the following:

(1) It accomplishes the instant warming of any quantity of water to any desired temperature; that is, by turning on both the cold water and the steam, the

water which is admitted cold is discharged as warm water at the shower or at the nozzle; hence this apparatus effects a saving of time.

(2) It also saves the first cost of a hot-water reservoir or boiler, because no such reservoir is needed; the space needed for the usual hot-water tank can be appropriated for other uses.

(3) It saves fuel, because there is no heat wasted, as is the case with hot-water reservoirs.

(4) The warm water generated by this method has no bad smell or bad taste, and is not in any way rendered impure.

(5) The apparatus works perfectly noiselessly, because water and steam do not come in contact with each other.

(6) The apparatus is perfectly safe and free from the danger of inflicting scaldings.

(7) The apparatus is capable of perfect regulation, and gives instantly hot water of any desired temperature (limited to 110° Fahr. in those apparatus which are constructed specially for bathing purposes).

(8) The apparatus is exceedingly economical in actual use, because it does away with hot-water tanks, and the corresponding amount of piping and a double set of valves or faucets. It requires only four connections, viz., two steam, a supply and return connection, and two water, the cold-water inlet and the warm-water outlet connections to the shower or to the tub, as the case may be.

The "Gegenstrom" apparatus is manufactured in various sizes and capacities. For smaller rain-bath establishments and wherever it is contemplated to allow each bather to regulate the water himself, the smallest size, as shown in the illustration, is used, and each apparatus supplies but one nozzle or douche.

In larger establishments, and wherever it is desired to bathe a number of people together, and as quickly as possible, it is better to fit up the larger sizes of the apparatus, capable of supplying warm water to two, four, six, eight, ten, twelve or twenty douches, and in this case the apparatus is controlled by some attendant, and not by each bather individually. (See Fig. 86, Chapter XII.)

A modification of the apparatus is suitable wherever large quantities of boiling or hot water are needed for washing or other purposes. A further modification of the same apparatus constitutes an economical and efficient feed-water heater for steam boilers.

After what I said in the early part of this chapter concerning the adoption of spray or rain baths, it is obvious that the "Gegenstrom" apparatus is suitable for a great many purposes. In fact, wherever steam is available it may be considered one of the most reliable, cheapest and most economical apparatus for heating water of which I have knowledge. The "Gegenstrom" apparatus is, therefore, applicable to public or people's baths, whether the same be fitted up with bathtubs or with rain baths or with swimming baths; it will also be particularly adapted in the case of hot mineral baths, because with this apparatus the mineral water can be heated without losing any of its component parts. The apparatus is likewise adapted for rain baths in factories, manufacturing establishments, schools, hospitals and institutions. A modification of the same is applicable for heating water for washing and scrubbing purposes.

It can be used on board of ocean steamships or vessels of the navy, for rain or tub baths for the passengers, officers and sailors, and for boiling water for making coffee or tea or other hot drinks, or for washing purposes, particularly in the emigrants' quarters. In hospitals, prisons, asylums and other public institutions, as well as in hotels, one form of the apparatus can be used for baths and another for heating water for kitchen and household service.

In breweries and malt houses it will be useful in connection with the cleaning of vats, kegs and barrels. In slaughter houses or abattoirs, where large quantities of hot water are used for flushing the floors of the buildings, in gas works, and numerous other industries the "Gegenstrom" apparatus may be used with advantage.

CHAPTER V

BATHS IN PRIVATE HOUSES AND IN TENEMENTS

House Baths — Bathrooms in private dwellings are more or less luxuriously fitted up according to the size, character. rental or cost of the house. In Chapter VIII of my work, "Sanitary Engineering of Buildings," I have discussed in detail the proper arrangements of bath apartments, and the reader is referred to the book mentioned for information. The essentials of a private bathroom are:

Convenient location.
Perfect ventilation.
Good light.
Soundproof construction of floors and walls.
Sufficient heating.
Avoidance of woodwork.
All plumbing work to be protected from freezing.
All plumbing fixtures to be sanitary, and entrance of sewer air to be avoided by proper trapping and flushing.
All plumbing to be open and exposed.
Floors and walls to be waterproof and non-slippery.

By far the majority of baths in private houses are full tub baths, with which an overhead shower or douche is often combined. We also find other forms of baths, such as the sitz bath, the foot bath, the child's bathtub in nursery bathrooms, the bidet and sometimes a shower and needle bath with separate stall and receptor. Sunken bathing pools of marble are not often provided on account of the difficult and expensive floor construction which they require.

The encased copper bathtub has almost become a thing of the past, and even houses of moderate rent have an open porcelain-lined iron tub, while solid porcelain tubs are extensively used in the houses of the well-to-do people. In placing the bathtub it is well to provide plenty of space between it and the wall, for cleaning purposes, or else tubs should be used which "key" into the tiled wall.

The provision of a servants' bathtub should never be neglected in private houses.

The walls of cheaper bathrooms are either plastered with rock or hard plaster, and oil painted, or else enameled, or they may be finished with "sanitary" and washable wall papers; in more expensive houses the walls are tiled or sometimes lined with slabs of marble.

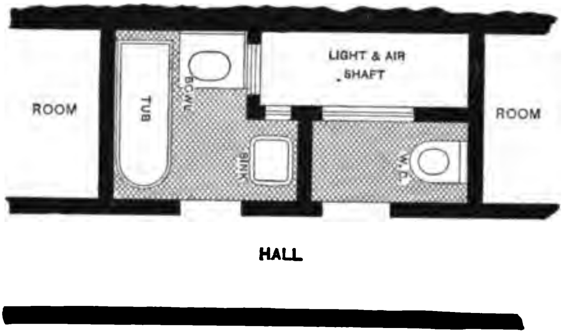


Fig. 11. Plan of Bathroom for Private House.

The ceiling is usually oil painted, but in some cases it is also tiled.

The floor should be made waterproof; it should not be slippery, nor too cold to the feet. Linoleum or cork matting forms a good and inexpensive floor covering, which is warm to the feet, smooth and easily cleaned. Sometimes the modern rubber tiling is used, and in expensive houses the floors are tiled or finished with marble mosaic or terrazzo. A bathroom also looks well where the fixtures are set on large countersunk marble slabs, while the remaining floor space is finished in hardwood.

The ideal of comfort is reached by providing the bathroom with an open fireplace with a wood, coal or gas fire.

The writer wishes to call attention again in this place to the undesirable and uncommendable American fashion of placing the water-closet in the bathroom. In not a few cases the water-closet fixture is old-fashioned, defective, unsanitary or at least far from pure, and a bather is thus compelled to breathe foul air while taking a bodily ablution. In small houses a water-closet fixture placed in the bathroom is useless to the rest of the household while the bathtub is being used, and *vice versa*, a bath cannot be taken while the water-closet is occupied. It seems to me, therefore, it is much to be preferred, on æsthetic as well as practical grounds, to provide a separate well-ventilated and well-lighted water-closet apartment. Even in the better class of houses, where there are several bathrooms, this arrangement is recommended. This matter is discussed in the above work, from which the accompanying illustrations, showing good arrangements of house bathrooms, are taken. (See Figs. 11, 12 and 13.)

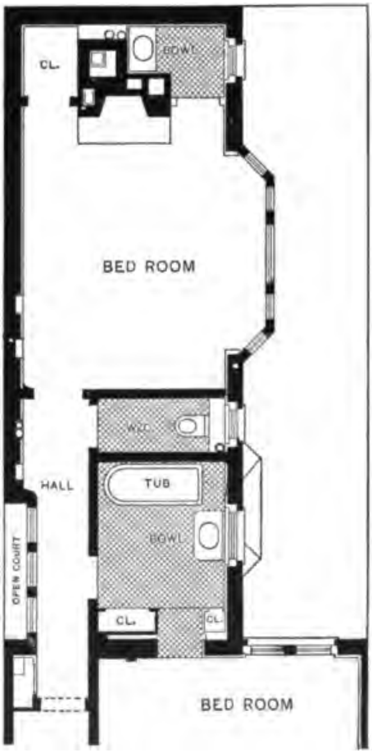


FIG. 12. PLAN OF BATHROOM FOR PRIVATE HOUSE.

The "spray bath," while pre-eminently a form of bath for people's, factory, school and hospital baths, is also very well adapted as a sanitary bath in private houses. It may be fitted up in a special waterproof stall, like the more complicated and costly needle bath, or it may be fitted up at the tub, as shown in Fig. 14, the tub acting as a receptor for the water while a bath is taken. A curtain pole, with white duck curtain, may easily and cheaply be arranged so as to prevent splashing and wetting the floor. Such a spray bath, with tepid water, may be taken every morning as a cleansing bath, and followed by a cold refreshing shower. The advantages of a house rain bath are the same as already enumerated, less hot water is consumed, and the bather does not take a bath while sitting in water *which does not remain clean*, but instead he stands in the tub, and after having soaped his body in the tepid stream the spray quickly washes off the soap and all skin impurities. In this way *the greatest cleanliness in bathing* is attained.

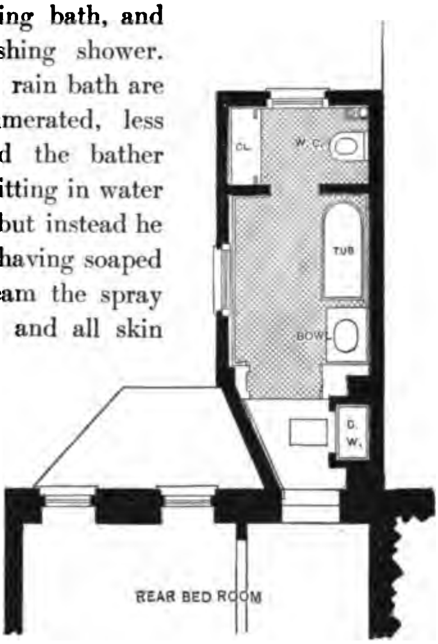


FIG. 13. PLAN OF BATHROOM FOR PRIVATE HOUSE.

Tenement Baths — A great step forward in the improvement of tenement houses would be made if they were provided with bathing facilities. As at present constructed and planned, even the best of them, including some of the so-called "model tenement houses," have absolutely no bathing facilities. One reason for this is, I presume, to be found, not so much in the first cost of the tubs and their plumbing connections, as in the fact that tubs without hot water would rarely be used, except perhaps during very hot weather. It is also probable that the bathtubs would not be rightly used, that the waste pipes would soon stop up, that the bathtub would not be kept clean, and that it would soon become unfit for use by being abused in other ways. I quote from the above-mentioned chapter of my book as follows: "Some well-meaning landlords are said to have tried the experiment of fitting up bathtubs in tenement houses, but have soon grown disheartened at finding tubs used as storage places for food, or as a depository for coal and ashes."

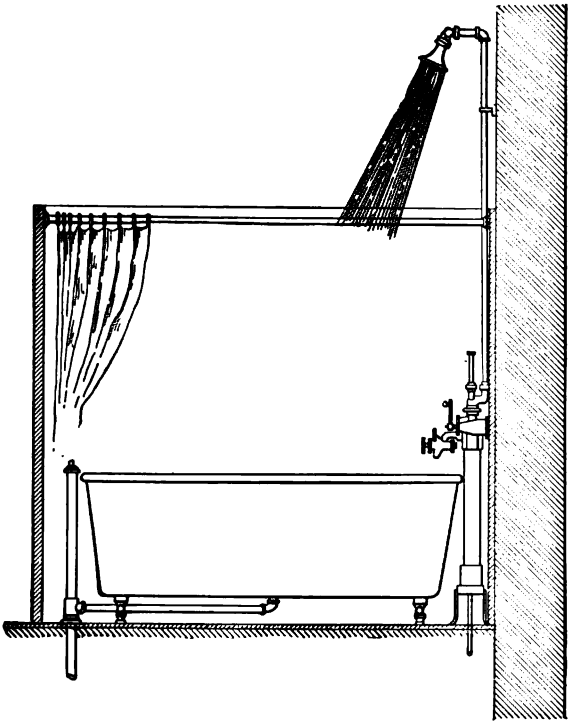


FIG. 14. BATHTUB WITH OVERHEAD RAIN BATH SPRAY.

I am firmly convinced that the rain or spray bath offers many advantages for tenement houses. It is not necessary to provide each tenement with such a bath. The individual bathtubs should be abolished, and instead a few simple and inexpensive, clean and inviting spray baths should be erected in a well-lighted corner of the basement, and kept under control of the janitor.

Such a plan would give to the tenants opportunity for frequent thorough ablutions in tepid water, and it would, doubtless, have a tendency to lead to increased cleanliness in the tenement itself, and would thereby improve the morals of their population, and also bring about a reduction in crime and vice.

CHAPTER VI

PUBLIC BATH HOUSES

PUBLIC bath houses are buildings erected for bathing purposes, and fitted up more or less luxuriously with some or all of the conveniences and appliances for bathing; in other words, with *single* baths, tubs and sprays, and also with *common* baths, like the smaller plunges or pools and the larger swimming tanks, and the hot-air and steam-vapor rooms. Both the cleansing baths and those for healthful muscular exercise and recreation are provided. A modern bath house contains waiting, lounging and reading rooms, dressing rooms, compartments with tub baths (which the Englishmen call slipper baths), others with douches, showers or sprays, with needle baths, foot baths, sitz baths, hot-air, vapor, steam and electric baths, also with swimming baths or pools, and sometimes also containing hot springs and medical baths, hairdressing establishments, chiropodist and manicure rooms and refreshment rooms. The baths are either provided in duplicate, for men and women, or else in smaller buildings different days or hours are appointed for the two sexes.

Such public bath houses are established in the larger cities, particularly in Europe, partly to make up for lack of bathing facilities in private houses, partly to provide baths for the traveling public. In Europe only the houses of the rich people have bathrooms, and the middle class patronize the public baths, which are usually elaborately fitted up and embrace all the different kinds of baths. In America, on the other hand, even small and unpretentious city houses or suburban cottages have a bath-tub supplied with hot and cold water. For this reason, and also because all hotels and the larger barber shops have baths attached, luxurious public bathing establishments are not so frequent here as in Europe; in fact, the public bath houses here are almost exclusively limited to the Russian and Turkish baths, fitted up with hot-air, moist vapor, electrical and massage baths.

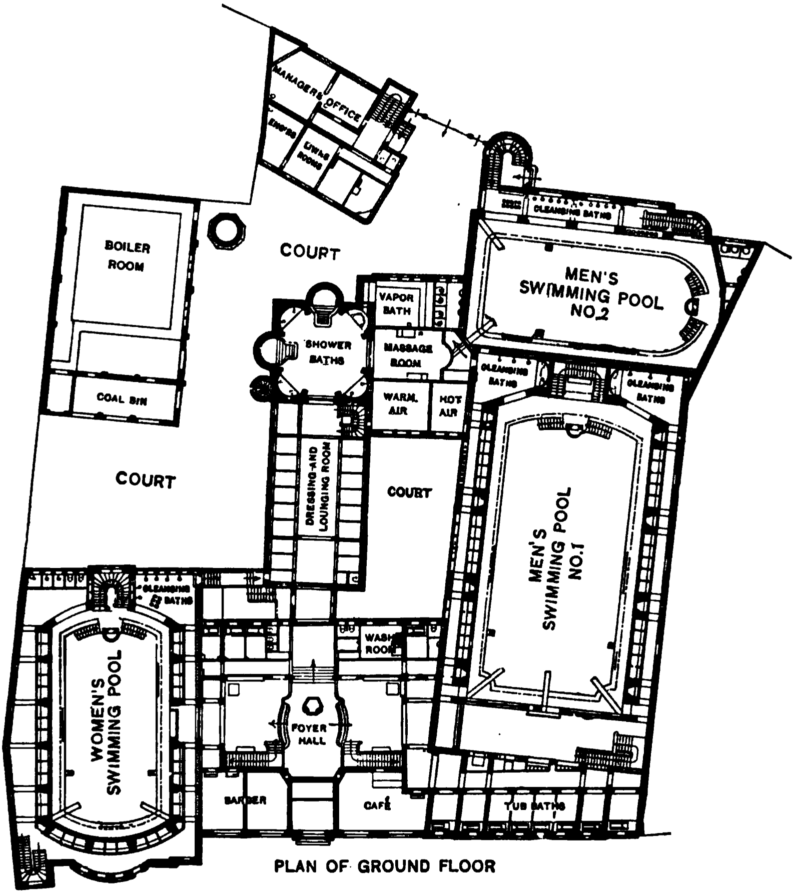

MANAGERS OFFICE
LIVING ROOMS
BOILER ROOM
COURT
COAL BIN
COURT
SHOWER BATHS
VAPOR BATH
MASSAGE ROOM
WARM AIR
HOT AIR
DRESSING AND LOUNGING ROOM
COURT
CLEANSING BATHS
MEN'S SWIMMING POOL NO.2
CLEANSING BATHS
CLEANSING BATHS
MEN'S SWIMMING POOL NO.1
CLEANSING BATHS
WOMEN'S SWIMMING POOL
WASH ROOM
FOYER HALL
BARBER
CAFÉ
TUB BATHS
PLAN OF GROUND FLOOR

FIG. 15. PLAN OF PUBLIC BATH HOUSE AT HANNOVER, GERMANY.

Whoever wishes to make a study of the design, interior arrangement and equipment of large bath houses should inspect some of the truly magnificent bath houses erected in the larger cities of the Continent of Europe as well as in England. During a recent trip in Europe the author visited a large number of public bath houses, and among the more important ones he mentions the following, which are well worthy of a visit: viz., the large public bath house of Bremen (see Fig. 25), located near the Union Railway Station; the Luebecker Thor People's baths in Hamburg; the public bath house in the Baerwaldstrasse in Berlin; the Guentzbad in Dresden (see Figs. 19, 20 and 21); the Mueller Volksbad in Munich (see Figs. 22, 23 and 24); the "Schwimmbad" in Stuttgart, and the "Volksbad" in Frankfort-on-Main. Fig. 15 shows the plan of the new public bath house at Hannover, and Fig. 16, 17 and 18 are interior views of this fine structure. Another example of an elaborate modern bath house is the large municipal bath at Frankfort-on-Main, completed in 1892.

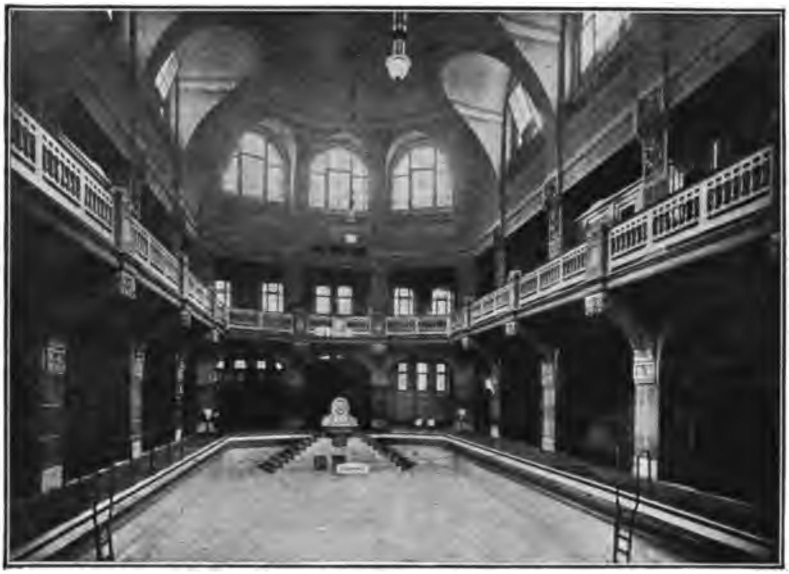


FIG. 16. INTERIOR VIEW OF SWIMMING BATH, IN PUBLIC BATH HOUSE, HANNOVER.

It is not intended in this book, which is written chiefly from an engineering and sanitary standpoint, to bring a discussion of purely architectural features. For these the reader is referred to the Bibliography in Chapter XVIII.

* * * * * * *

In his address on "Recent Advances in Preventive Medicine," delivered at a meeting of the American Medical Association in Chicago, in 1887, Dr. George H. Rohé, of Baltimore, Md., showed that, contrary to popular belief, a large proportion of the inhabitants of American cities are deprived of proper bathing facilities. He collected statistics from eighteen cities, having no free public baths, which showed that only about 23 per cent of residences are supplied with bathtubs. He concludes that "five-sixths of the inhabitants of these cities have no facilities for bathing, except such as are afforded by pail and sponge, or a river, lake or other body of water which may be easily accessible, but in winter even such sources of cleanliness are cut off."

Dr. Rohé's table referred to gives the following figures:

NAME OF CITY	NUMBER OF HOUSES IN CITY	NUMBER OF HOUSES SUPPLIED WITH BATHTUBS
Baltimore, Md.	70,000	20,000
Bridgeport, Conn.	6,000	2,000
Cambridge, Mass..	9,389	2,315
Charleston, S.C.	10,000	500
Cincinnati, O.	33,471	6,000
Lancaster, Pa.	5,600	1,000
Lynn, Mass.	5,800	1,238
Milwaukee, Wis.	25,000	3,000
Minneapolis, Minn.	17,000	3,000
New Bedford, Mass.	5,237	597
Peoria, Ill.	7,600	800
Portland, Me.	7,188	1,153
Reading, Pa.	11,000	1,900
Savannah, Ga.	6,000	4,000
Somerville, Mass.	2,000	500
St. Louis, Mo.	50,000	8,000
St. Paul, Minn.	30,000	10,000
Wilmington, Del.	12,000	5,000

The need of cheap and plain public baths for the masses and for the working people of both sexes is, therefore, apparently just as urgent here as it is in Europe. Such baths are better characterized as "People's Baths," under which name they will be spoken of in the next two chapters. These should be comfortable and clean but without any luxury, and may be provided by State laws, by the municipality, by bureaus of charities or by private charitable associations. Public bath houses, on the other hand, are more frequently erected by private individuals or firms as a money-paying enterprise. In Europe, however, there are a number of large public bath houses which are built by the municipality.

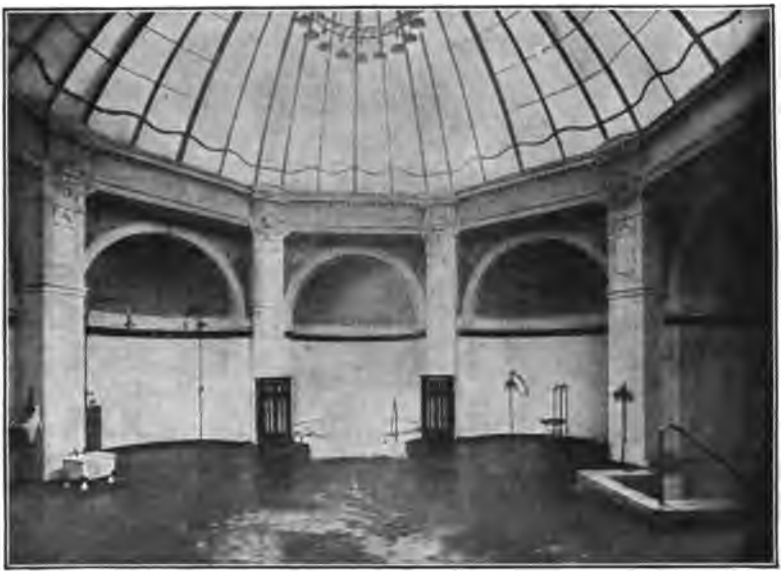


Fig. 17. View of Shower Baths and Plunge in Turkish Bath of Public Bath House, Hannover, Germany.

Large public bathing establishments, in order to be complete, must contain all the different forms of baths mentioned heretofore; in other words, they comprise a large number of separate compartments for bathtubs, and in European bath houses there are often two classes of these, for which different prices of admission are charged. They always contain one or several swimming baths, with the needed dressing compartments and preparatory cleansing baths in the form of showers and foot baths, and besides they embrace Turkish and hot-air baths, with dressing rooms, smoking and reading rooms, massage rooms, shampooing rooms, cooling or lounging rooms, and rooms for special electrical or hydrotherapeutic treatment. The buildings require attractive entrances, ticket offices, large waiting rooms for the public, minor rooms for barber shop and chiropodist's offices, and sometimes a restaurant or buffet, besides rooms for the attendants, a large laundry, ironing and drying rooms, rooms for storage of towels, sheets and soap, boiler room, fuel room, and the necessary toilet rooms with water closets, urinals, and wash basins for patrons and employees. All of the above rooms should be provided in duplicate for men and women, and should be entirely separated for the two sexes.

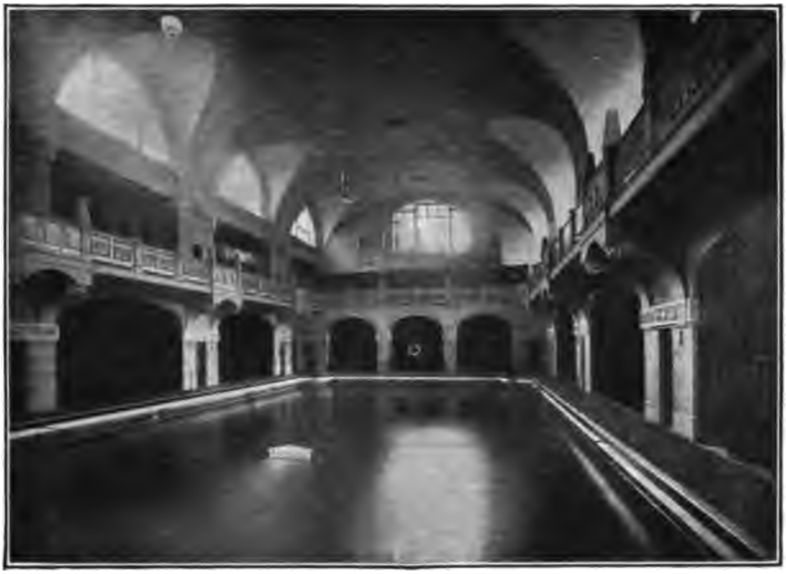


FIG. 18. VIEW OF SWIMMING POOL IN PUBLIC BATH HOUSE, HANNOVER.

For the tub baths numerous bathing cells or compartments are provided, the size of each compartment being about 6 feet by 6½ feet, though some are made as large as 8 feet by 10 feet.

The best arrangement is that which provides a long central corridor, not less than four feet in width, with the compartments located on both sides and separated by partitions of wood, marble or enameled brick. Each compartment should be roomy to hold not only a fair-sized bathtub, but also to afford convenient room for undressing. It is desirable that provision should be made for an overhead spray at each tub, or, at least, a flexible hand spray with rubber tubing should be available, so that at the end of the bath the person may spray the body with pure water and wash off any impurities attaching to the skin from the soiled water of the tub, but also that a bather may avoid catching cold by closing up the pores of the skin with the aid of a final cool or cold shower.

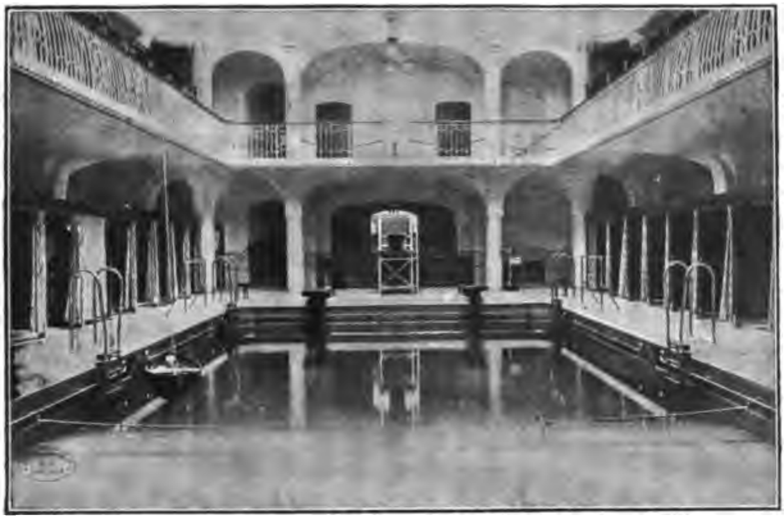


Fig. 19. View in Guentz Bath House Dresden, Germany.

For shower or spray baths the size of the compartment varies from 4 feet by 6 feet to 5 feet by 8 feet.

The greatest possible cleanliness must be maintained in public bathing establishments, and the tubs in particular should always be thoroughly scrubbed and cleaned by the attendants after each use. Regarding the shape and material of tubs see Chapter III.

In nearly all large public bath houses the swimming bath is a prominent feature; in the bath houses of inland towns a swimming pool is particularly desirable. It should be located in a large and lofty, well-lighted and well-ventilated hall, and be made as attractive and inviting as possible. In public bath houses the swimming bath is, as a rule, located on the ground floor, and a location in the basement, as in the case of clubhouses or gymnasia, is generally undesirable.

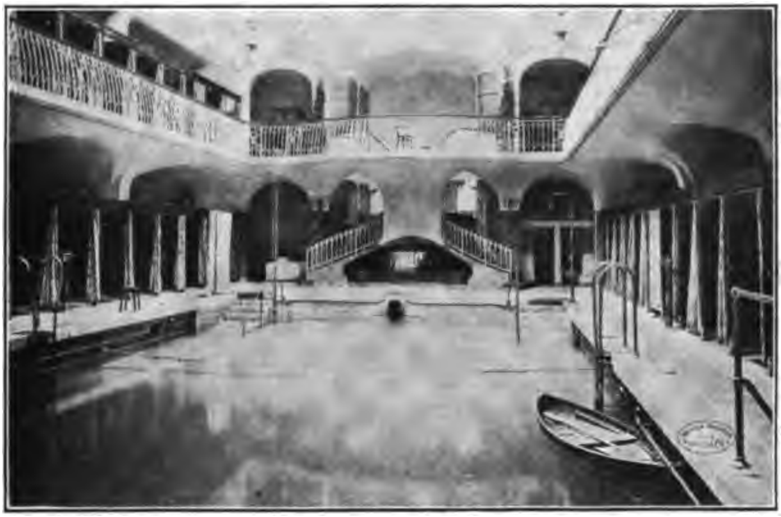


FIG. 20. VIEW IN GUENTZ BATH HOUSE, DRESDEN, GERMANY.

A very necessary precaution for swimming halls consists in arranging cleansing or preparatory baths, both foot and douche baths with hot and cold water, where each bather is required to go to soap and clean himself thoroughly, preliminary to his being admitted to the swimming basin. This rule should be rigorously enforced in every well-regulated bath house to preserve the purity of the water in the tank and in this way to guard against any possible transmission of infectious disease.

The purity of the water is further protected by arranging suitable expectorating openings, or sometimes an entire gutter running around the top of the basin, and flushed from the overflowing water.

The bathing master in charge should enforce the rule that no spitting is permitted. The bathers themselves should see that this rule is lived up to, and that no other contamination of the swimming basin, due to carelessness or ignorance, occurs. No dirty water from the gangways should be permitted to run into the pool.

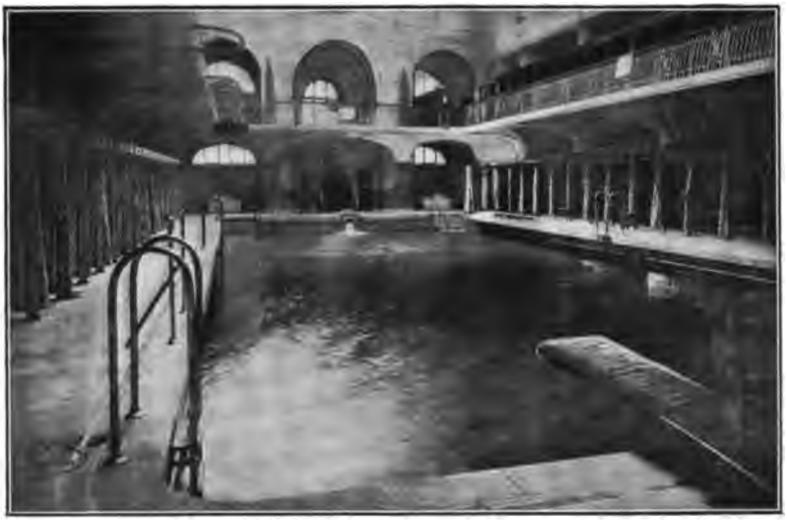


FIG. 21. VIEW IN GUENTZ BATH HOUSE, DRESDEN, GERMANY.

It is also important that suitable toilet rooms be provided conveniently near to the dressing rooms.

Notwithstanding all precautions, the water in the basin may become slightly contaminated by skin abrations, by oily secretions from the bodies of swimmers, by bathers carelessly expectorating into the water, by dust and dirt, etc., hence it is important that the surface of the water be kept artificially stirred and in constant motion. This is accomplished by fountains, special surface sprays, cascades or douches, which tend to aerate the water, or by special mechanical means to set the water in motion. The inflowing water supplying the pool should be made to traverse the greater part of it and not find a short way to the overflow gutter.

The water in the large tank should be constantly replenished, *i.e.*, new water should flow in to take the place of that overflowing and wasting to the sewer. It is a bad practice, from a sanitary point of view, to circulate the water over and over, still this is often done to save in the water bill. The inflow should be at such rate and volume that the whole contents of the basin be changed *at least* once in twenty-four hours.

FIG. 22. VIEW OF THE KARL MUELLER PUBLIC BATH HOUSE IN MUNICH, GERMANY.

The swimming basin should be completely emptied, its walls and bottom and the stairs cleaned and all slimy deposit removed, and it should be refilled with fresh water at least twice a week.

Details of Swimming Baths — A swimming basin is usually oblong in shape, but sometimes it is circular or its plan may be a rectangle with one or both ends semicircular. At one or more

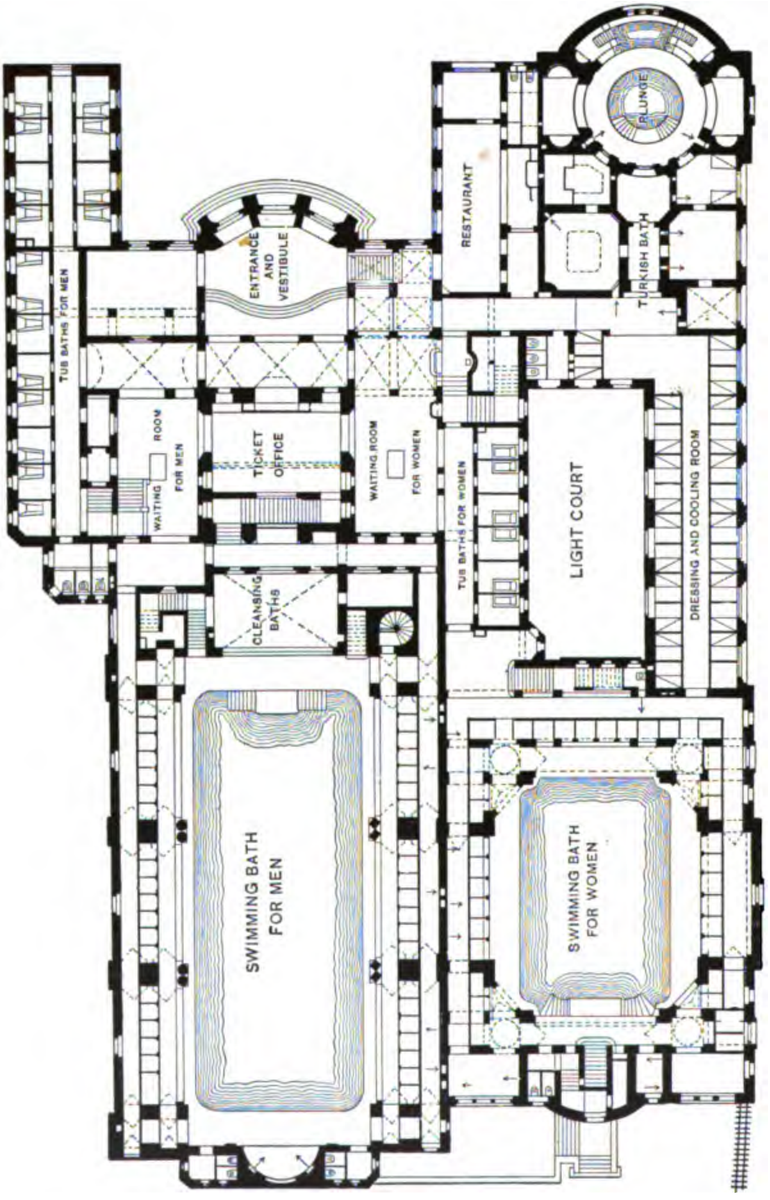

TUB BATHS FOR MEN
ENTRANCE AND VESTIBULE
RESTAURANT
PLUNGE
TURKISH BATH
WAITING ROOM FOR MEN
TICKET OFFICE
WAITING ROOM FOR WOMEN
TUB BATHS FOR WOMEN
LIGHT COURT
DRESSING AND COOLING ROOM
CLEANSING BATHS
SWIMMING BATH FOR MEN
SWIMMING BATH FOR WOMEN

Fig. 23. Plan of the Karl Mueller Public Bath House in Munich, Germany.

sides or corners of the basin wooden or else marble steps are provided to enter the bath.

The size and dimensions of a swimming tank depend upon the available space of the bath house site. In some of the European bath houses two basins are provided, of which one is for swimmers and the other for non-swimmers. In that case about 24 square feet of water surface are provided for each swimmer, and from 10 to 12 square feet for non-swimmers. Where, on the other hand, one basin answers for both swimmers and non-swimmers, the bottom is made sloping, so as to obtain a shallow and a deep end, and a net or line is drawn across to indicate the division, and to prevent non-swimmers from going beyond their depth.

A pool or tank 100 feet long and 40 feet wide is considered to be a large pool, and is suitable for swimming exercises as well as for water polo games. Usually pools are from 30 to 75 feet long and 15 to 30 feet wide. Where swimming pools are provided separately for men and for women, the men's bath is made about 75 x 35 feet, and the women's 60 x 30 feet, or in this proportion. Of course, the larger the basin the greater becomes the expense for heating the water, particularly in winter, when the temperature of the cold water is low, but at all times on account of the expense for renewing the water in the pool.

The depth of water in the pool varies from 3 or 3½ feet at the shallow end to 7½ feet at the deep end. Where separate pools are provided for swimmers and non-swimmers, it is not necessary to slope the bottom, but an even depth can be maintained. For diving even a depth of 7½ feet is hardly sufficient and none but experienced divers should attempt the feat in an ordinary basin.

Where fixed or stationary diving boards are provided, there should be from 8 to 9 feet depth of water just below the end of the diving board, but it is not necessary to carry this depth to the extreme deep end of the basin.

A swimming basin 100 x 40 feet and 5 feet average depth of water holds 20,000 cubic feet or 150,000 United States gallons. A basin 75 x 35 feet and from 3½ to 7½ feet deep has a water capacity of 108,281 gallons; and a basin 60 x 30 feet and from 3½ to 6½ feet deep contains 67,500 United States gallons.

The swimming basin is built of brick or Portland cement masonry. The walls must be constructed with due regard to stability and to water tightness. The outer shell of smaller pools consists sometimes of iron, lined on the inside with asbestos paper or other waterproof material. Asphalt is much used for this purpose, and the lining should be about one inch thick.

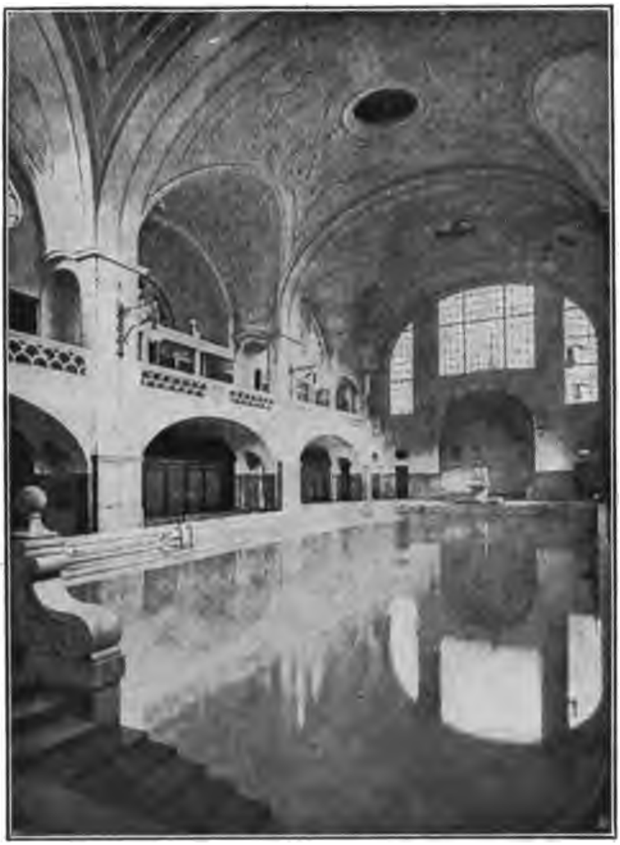


Fig. 24. Interior View in Karl Mueller Public Bath House in Munich, Germany.

The bottom of the basin is built in concrete and carefully covered with layers of asphalt. After being waterproofed, the pool should be tested for tightness before applying the finishing lining. The side walls may be finished with a course of white enameled brick, with glazed tiles, with slabs of marble or with white glass.

It may be said that while white seems to be the color most desirable from a sanitary point of view, it is not always the best, because if the water is at all turbid, it will look worse in a white pool than in a basin finished with colored tiles or marble. Water should, therefore, always be filtered where the basin is finished in white. In Germany I saw many swimming basins, in some of the bath houses mentioned heretofore, which looked exceedingly attractive, and which had linings of bluish or greenish tiles both on the sides and in the bottom. The water looked particularly inviting in these pools and resembled more that of lakes or clear streams. Due attention should be given to the bottom, which should not be too slippery.

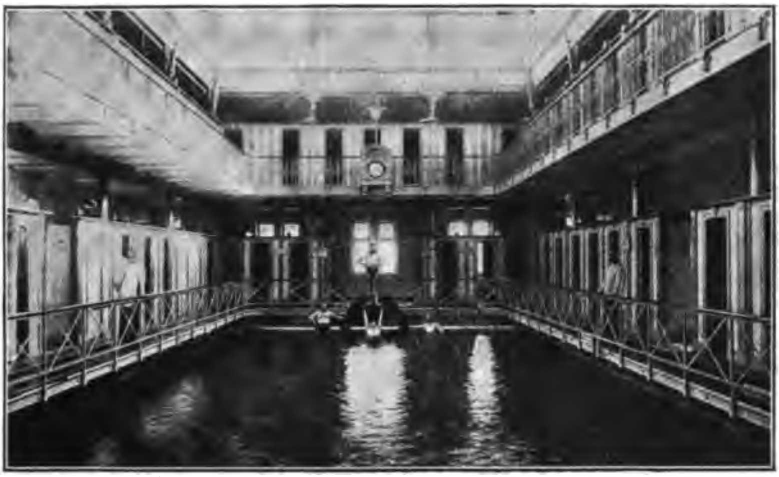


FIG. 25. INTERIOR VIEW OF PEOPLE'S BATH HOUSE AT BREMEN, GERMANY.

The basin should have one or several large waste pipes, to empty it *quickly*, also suitable overflow pipes, and sometimes openings are provided on the sides and above the water line for spitting, or else a scum gutter is carried on the long sides of the basin or even all around it. It is advisable to provide a well-fastened brass rail located just above the water line for tired swimmers. There are also needed a jumping board, and occasionally a diving board, hook poles, life preservers and life lines in case of accidents. Sometimes a brass railing is set on the gangway running around the tank, but more often it is omitted.

A gangway or passage should surround the pool on all sides. This should not be less than 3 feet wide, and it is better to make it 4½ feet, and the ends 6 feet wide. The floor of the gangway should have a raised nosing, projecting from 6 to 12 inches over the pool; the water in the basin is usually from 2 to 3 feet below the level of the gangway. The gangway should be paved with large, white, unglazed tiles, with mosaic tiling or cement flooring, and the floor should incline away from the basin so that no impure water can run into it.

The dressing rooms are located along two or three sides of the gangway. A better plan, which is nearly always found in the German bath houses, is to provide two gangways, one an outer one, for the bathers to use to enter the dressing rooms before the bath, the inner one to be restricted to the bathers only who have undressed or who come out of the bath. This precaution avoids the soiling of the inner gangway by dirty shoes and greatly helps to maintain cleanliness, although it requires additional space, which in centers of cities where the price of land is high cannot always be obtained.

The dressing rooms are located along the two long sides of the pool, and where a larger number is required additional ones are sometimes placed on a gallery above the lower tier of rooms, which gallery also answers for the spectators. The minimum size of dressing rooms is 3½ feet square, but it is better to make them larger, viz., 4 feet x 5 feet. The partitions are sometimes built with enameled bricks, or else they are of marble, and in cheaper outfits of wood. The doors should be about 2 feet

2 inches wide. The rooms should contain a seat or bench, some clothes hooks, a bootjack, a mirror, and comb and brush.

The swimming hall should be well warmed in winter, a temperature of 75–80° Fahr. being desirable, and it must be well ventilated at all times of the year. In many of the German baths visited by me I found provision made for cooling the air in summer by means of water sprays located at the ceiling, usually at the four corners of the pool, and controlled by valves accessible from the main floor. The swimming basin should be well lighted, to render it more attractive and also for the better maintenance of cleanliness. It is found by experience that side light from high windows is preferable to overhead skylights, on account of the glare and heat of the sun where the latter are used.

The water in the swimming basin must be kept at a suitable temperature, and must be maintained in winter time at about 70° Fahr. The water may be warmed by the direct introduction of steam, or it is heated by steam coils located near the bottom at the sides of the basin. The better plan, however, is to heat the water in special large hot water heaters, and to allow it to flow into the tank, sometimes mixed with the colder water. To warm the water by continuous circulation is not considered a good practice from a sanitary point of view, though it is the cheapest method. (See Chapter XVII.)

Ocean and river swimming baths are discussed in Chapter XIV.

CHAPTER VII

PEOPLE'S BATHS

LUXURIOUSLY appointed public baths in costly monumental buildings are intended more for well-to-do people, and are not at all adapted for the requirements of the working classes of laborers, mechanics, factory operatives, etc., who often are employed in the midst of dirt or dust of all kinds, and are always exposed to different sources of uncleanliness. And while the wealthy women have ample bathing facilities at home or can find them at the expensive Turkish-bath establishments, the needs of the working women, of factory girls, saleswomen, etc. are often forgotten. Even for our domestic female servants, opportunities for bathing and bodily cleanliness are not always thought of, even in the most richly appointed houses and mansions.

This explains in part why women bathe less nowadays than in former times. But both men and women of the poorer classes of the population are debarred from using the public bathing establishments by the price charged for a bath, as well as by other reasons.

About the need and desirability of people's bath houses in cities there can, therefore, be no question. In 1904 only thirty-four cities in the United States had more or less adequate provision for bathing for the people. It is very seldom, indeed, as mentioned in another chapter, that tenement houses have any baths; even the so-called "model" tenement houses do not provide bathing facilities. In most of the tenement houses hot water is unknown, and their occupants have merely the city river baths to go to, which are available only a few months in the year.

But floating river baths and the sea baths in the harbor or on the beaches do not suffice, for they not only provide bathing facilities for a part of the year only, but in some cases are located at a distance from the homes of the working people, and are, therefore, difficult and expensive to reach.

Bathing can be rendered popular by providing *people's baths*. Such baths should be simple, unpretentious, yet neat, clean, substantial and inviting structures, well warmed, well lighted and ventilated, provided with all necessary means for cleanliness and comfort, but *without* any superfluous luxury, and withall arranged so as to give a bath quickly, comfortably and *cheaply*.

Many hold that people's baths should not be free, as the respectable poor unconsciously shrink away from anything that looks like charity. A moderate fee, if any, may be charged, sufficient, if possible, to cover the cost of maintenance. If there is at present too little appreciation of the healthful effects of bathing in the lower classes of our population, it is largely on account of the lack of baths in cities. Let bathing opportunities at reasonable expense be provided, and the people will surely make use of them, and bathing will once more become popular with the masses, as it was centuries ago. With increased care of the body and bodily cleanliness will go hand in hand cleanliness in the clothing and the underwear, as well as in the habitations, and this in turn will lead to vast improvements in the ventilation, and in the general health conditions of a community. It will also tend to lessen the ravages of contagious diseases, which are particularly marked where there is absence of cleanliness.

In April, 1895, the Legislature passed, and the Governor of the State of New York signed a bill which provided for the establishment of *free* public baths in cities, villages and towns in the State. The Act, which is known as Chapter 351, Laws of 1895, provides substantially that all cities of the first and second class shall establish and maintain such number of free public baths as the local Board of Health will determine to be necessary; that each bath shall be kept open not less than fourteen hours each day, and that both hot and cold water shall be provided. It also states that the erection and maintenance of river or ocean baths shall *not* be deemed a compliance with the requirements of the law.

This law, I am informed, was advocated and persistently pushed by Mr. Goodwin Brown, a former member of the New York State Lunacy Commission, and to him great credit is due for having secured the first legislation on the subject of baths ever had in this country. Three years previously he had secured the passage of a bill making the erection of public baths permissible, while the present law makes it a mandatory measure.

My personal belief is that, laws or no laws, every municipality has the moral duty to provide public baths, which tend to reduce the general mortality of cities and the number of sick in the hospitals. Hence every public-spirited citizen should encourage the establishment of baths, not only in public bath houses, but also in schools, in factories and the like.

Success or failure of a people's bath will largely depend upon its suitable location as well as construction. In order to popularize bathing and render people's baths useful, serviceable and well patronized, they should be located convenient of access, and in the midst of the thickly populated city districts, preferably near the streets forming the main line of traffic.

The municipal government either erects such baths, or else it provides the site for the bath house, while the building is sometimes built by charitable associations or public-spirited citizens, as the Walters baths in Baltimore, erected in 1900, and the Center Market and East 38th Street bath houses in New York City.

In Germany a nominal charge of from one and one-fourth to two and one-half cents is made for a bath, and the bather is furnished with five gallons of tepid water and a piece of soap as well as a towel.

Outside of New York State the aim should, in my judgment, be to make people's baths self-supporting, by charging a minimum admission fee; medical societies and public health associations may accomplish much by encouraging their erection.

The exterior of a people's bath building (see Fig. 36, Chapter VIII) should be easily recognizable in order to be readily found, but all outward display of lavishness in the architecture of the building must be avoided, as this would only have a tendency to keep the poor people away. The construction and the equipment of the interior should likewise be economical, yet substantial, cleanly and inviting, but without any of the refinement of details found in the large public bath houses.

Where a source of steam supply is available, as, for instance, near electric-light and railroad stations, near waterworks pumping stations, disinfecting stations, and at all larger industrial establishments, the running expenses of the baths, for heating the bath water and warming the building, may be reduced by making suitable arrangements for using the exhaust steam of the boiler plant.

In planning and erecting municipal people's baths the questions arise: What form of bath is best adapted for them? Shall single baths (tubs, douches, sprays) or common baths (swimming pools) or shall both be provided?

If single baths are decided upon, shall the compartments be fitted up with tubs or with sprays?

It is plainly evident that a marble or tile-lined swimming plunge or basin, filled with water of crystal-like purity, is not well adapted to the needs of the workingman, for it is not a cleansing form of bath; soaping and cleansing in them are obviously excluded, besides it requires very large quantities of water, which must be heated, and it is an expensive form of bath generally, in construction as well as in maintenance; it is not a form of bath suitable for the masses. It has already been pointed out that in all pools or basins where persons bathe together there is some danger of skin diseases being transmitted from one person to another.

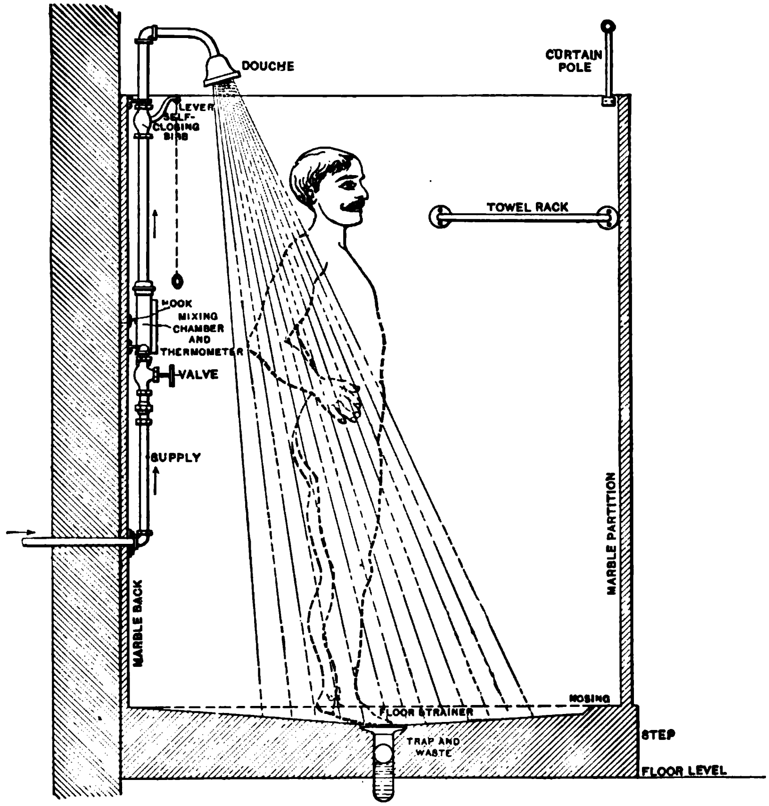
Neither is a porcelain-lined pure white bathtub suitable for fixtures of people's baths, for good tubs are expensive, while a workingman cannot quickly and readily become cleaned in them; in fact, he would wash the impurities *into* the bath and would, toward the end of the bath, sit immersed in his own befouled water. He would require several changes of water in the tub, hence more water and correspondingly more time to become clean. Again, after he is through with the bath, it would require a good deal of cleaning and scouring to remove the dirt attaching to the sides of the tub; this would result in increased labor for the attendants to restore the tubs to their former state of purity and involve greater cost in running expenses. The tubs, as a form of bath, should therefore be abolished or greatly restricted in number.

At the Berlin Health Exhibition of 1883 the solution of the problem of providing cheap baths for the masses was first indicated by the people's baths of Grove-Lassar. The novelty, as we have already seen in Chapter IV, consisted in the use of an inclined overhead tepid spray in place of the tub or the plunge. It was perhaps not strictly new, as it had been used previously in prisons and in military barracks, but the novelty consisted rather in the suggestion to use this form of bath for people's baths.

No form of bath is better adapted, from a hygienic and economical point of view, for working people than the tepid spray or "rain bath." Its hygienic as well as economical advantages are many. It is the simplest, quickest, cheapest, cleanest and withal best form of bath for people's bath houses; it is the one which requires the least expense in fitting up, the least space, the least time in use, the least amount of water, the least fuel for warming the water, the least attendance and the least cost for repairs and maintenance.

Standing on a water-tight, well-drained floor, or sometimes in a sunken basin under an inclined spray, the bather can soap and rub his body, rinse it with more tepid clean water, which falls down over his body from the inclined spray in a gentle yet invigorating rain or in fine jets from the neck downward (see Fig. 26.), and finally he can let some pure and colder water flow to increase the mechanical and tonic effect and to prevent the catching of cold. While he is bathing all waste water flows away quickly and immediately through a large waste pipe. Hence the bather is not immersed in water which becomes more and more impure from his ablution, and in which he continues to bathe, but the clean fresh water which descends upon him from the overhead spray instantly washes off all dirt, soap and waste matter from the skin.

Such a simple bath at once cleanses, refreshes and invigorates a person; it therefore has the cleansing and tonic effect combined. When one bather has finished using the bath compartment, it is quickly gotten ready for the next bather. For all these reasons, purposely set forth here in detail, the rain bath has become the modern favorite method, it is the best form of bath, and is destined to be the bath of the future for people's baths. To quote from an English report, "the spray bath is an agreeable, healthy and


DOUCHE
CURTAIN POLE
LEVER
SELF-CLOSING BIBB
HOOK
MIXING CHAMBER AND THERMOMETER
VALVE
SUPPLY
TOWEL RACK
MARBLE PARTITION
MARBLE BACK
NOSING
FLOOR STRAINER
TRAP AND WASTE
STEP
FLOOR LEVEL

SECTION C-D

FIG. 26. SECTION OF RAIN BATH COMPARTMENT IN THE HEBREW INSTITUTE, N. Y.

economical bath. Its superiority over the tub bath should be evident to any one approaching the subject with an unprejudiced mind."

People's rain baths have proven to be very popular in Austria and in Germany, but they are not as yet generally introduced in England, although their advantages are beginning to be recognized. In some recent experiments carried out at Cheltenham, the superiority of the spray baths was clearly established; for while 36 bathers bathed in six tubs in two hours, 144 persons bathed during the same time in six spray baths. Hence one spray bath did the work of four tub baths. In the United States people's rain baths have been very successful wherever recently established.

A building containing people's baths requires the following rooms:

(1) *For the use of the public or the bathers:* entrances, vestibules and waiting rooms, generally separate for men and women, except where in the same bath different days of the week are assigned to the sexes; with benches or seats, reading tables and a drinking fountain, corridors leading to the bath compartments; bath apartments with sprays and dressing rooms; water-closets and urinals, which should never be omitted and which should have simple and automatic plumbing.

(2) *For use of the management:* ticket office, room for attendant, boiler room and place for the apparatus for warming the bath water; closets for storage of towels, soap, etc., drying rooms, laundry and ironing rooms, and place for the storage of fuel.

In some establishments the laundry is omitted entirely, the washing being done outside. The vestibules are required to prevent drafts and to protect the bathers against catching cold. Spacious, cheerful and warm waiting rooms are required, in which the public may wait for a bath and also sit to cool off after the bath. The floors, walls and seats of the waiting room must be so arranged that they can be frequently washed to insure constant cleanliness and inviting appearance.

The ticket office should, wherever practicable, be so arranged that the agent or bath master can overlook the waiting room and the corridors leading to the baths.

The bathing hall or apartment proper should, for the sake of privacy, be divided off by partitions into a number of separate compartments.

Each compartment again is subdivided and contains an outer dressing room and an inner room, which is the bath proper. All floors, walls, partitions and ceilings should consist of non-porous material, one which is not readily destroyed by the action of soap, warm water, dampness and steam vapors.

Perfect drainage arrangements are indispensable. The best plan is to provide separate waste pipes and strainers for each compartment. The plumbing is simplified and rendered cheaper where open gutters are provided with a few drainage outlets, but to my mind the scheme is not so sanitary.

Good daylight and artificial illumination are desirable, though too many large windows have a tendency to create chilling drafts. Abundant provision for ventilation is necessary, and all dividing partitions must be raised from the floor at least eight inches to promote the air circulation.

The floor should be water-tight and may be either of cement, asphalt, terrazzo, marble mosaic or of unglazed tiling. In the bath proper the floor is often molded in cement in such a way as to have a depression or sunk basin, suitable as a foot bath.

For the finish of the walls of the bathroom slate, marble, alberene stone, annealed glass or tiling are desirable, whereas the dressing room may consist of enamel-painted iron, or of iron ribs, iron lathing and hard plaster or cement, or else it may be of hardwood, well oiled.

At the ceiling unprotected iron should be avoided, as it rusts from the vapor of condensation and causes disagreeable dripping.

The size of each complete dressing and bath compartment should be approximately four feet wide and eight feet deep. The entrance from the corridor should have a light flap door, with an inside latch and a lock on the outside, for which the bath attendants should have the pass key. The bath proper is separated from the dressing room either by a fixed partition, with or without door, or more usually merely by a rubber or white duck curtain.

The bath compartment contains the inclined overhead spray or shower, with or without regulating or mixing valve; on the women's side it is desirable to add an ascending jet or spray. (See Fig. 44b.) There should be a stationary or hinged seat for the bather, or else a footstool, and where the floor is not shaped in basin form a small galvanized iron foot tub is sometimes added. Each bath should also have a perforated soap cup.

The dressing room should contain a seat, hat and clothes hooks, bootjack, cuspidor, a wooden latticed grating or a cork mat, and sometimes a shelf, with mirror, brush and comb. On the other side of the bath door is hung a slate, on which the attendant notes the time when the bath is occupied in order to control the bathing. One-half hour is generally fixed as the limit for each bath, but on very frequented days the time limit is sometimes cut down to twenty minutes. In some of the people's bath houses on the Continent there is a clock placed at each door, which is set by the bath attendant when the bath is occupied.

Among the first people's rain baths built in New York City are the baths at Center Market Place, erected under the auspices of the New York Association for Improving the Condition of the Poor, and the Baron de Hirsch baths, fitted up in a leased tenement building at the corner of Henry and Market Streets, by the Trustees of the Baron de Hirsch fund. (See Fig. 28.) There are also a small number of baths in the Demilt Dispensary, at the corner of Second Avenue and 23d Street, and a few in the Hebrew Institute, at the corner of Jefferson Street and East Broadway.

The Center Market Place bath is described and illustrated in a small brochure issued by the above association. I give in the following a condensed description of the other baths, the plumbing for which was put in under my specifications and superintendence.

Baths in the Demilt Dispensary — There are six rain baths and one tub bath, the latter for invalids and for children; all baths are located in the basement. Provision has been made for the future fitting up of six or more additional baths. These baths are intended to be used by men and women on alternating days of the week.

Each bath consists of two compartments, the dressing room and the bath proper, and each compartment is about 3½ feet square. The dressing room has wooden partitions and wooden lattice doors, about 7 feet 3 inches high, while the bath proper has walls lined with 1¼-inch blue-veined Italian marble slabs. The floor of both compartments is concreted. The bathroom proper has a depression of about 6 inches in the floor, with a metal strainer over the waste pipe. Each bath has also a large overflow pipe and strainer placed in the side of the depression at a suitable height; the openings of the wastepipe strainer are so graduated that while the water flows off, it does not flow out as fast as delivered by the spray; consequently there are always a few inches of water in the bottom of the trough, so that the bather's feet stand immersed in water.

The water is delivered by an inclined rain shower, standing at a height of about 6½ feet from the floor, and under such an angle that the "rain" will not strike above the neck of the bather. The flow of water is under control of a janitor. As soon as the bather is undressed he steps into the bath compartment and announces, by an electric bell, that he wishes the water turned on. The janitor goes to the valve board in the waiting-room, notices the number of the bath on the annunciator, opens the respective cold and hot water valve, and allows the water to mix in the mixing chamber. The temperature of the mixture is indicated on a hot-water thermometer, of which there are as many as there are mixing chambers, viz., six. As soon as the water has been tempered to the right temperature the janitor opens the valve controlling the shower. When the bather has finished he rings the bell once more, and the water is shut off.

Each bather receives a piece of soap and a towel. The charge for bath, soap and towel is ten cents, but persons who cannot afford to pay this sum can have a bath without charge.

It was at first contemplated to heat the water with steam in a Tobey hot-water heater, but no steam being available for this purpose, a Boynton hot-water heater was put up in the basement with a 200-gallon tank as a reservoir for hot water.

All water pipes are of galvanized wrought-iron pipe, and the sprays are of copper.

One separate bathtub is installed for the use of invalids and mothers who bring children with them. It is an enameled roll-rim iron bathtub, standing on legs, raised 14 inches high, so as to be at a convenient height to bathe children. The outside of the tub and all wooden partitions are painted with Aspinall's special bath enamel.

The plumbing work pertaining to the baths is carried out in strict accordance with the New York Board of Health regulations. Each bath is trapped separately, and all traps are amply ventilated.

Water is obtained by meter measurement through a 1-inch tap in the street main, with a 2-inch galvanized wrought-iron service pipe.

The lighting is done by gas, and heating by the hot-water heater and some steam pipes.

The author carried out the following experiments by meter measurement of the quantity of water used in these baths:

The bathtub, which is 5½ feet long and 24 inches wide, required, when filled to within 5 inches of the overflow, about 6 cubic feet, or 45 United States gallons of water. With both faucets running it took about two minutes to fill the bathtub; the pressure of water was estimated at about 20 pounds per square inch. The shower bath, on the other hand, with both hot and cold water valves about half open, delivered 4.75 cubic feet in five minutes, or 35.625 United States gallons in five minutes, or 7.125 gallons per minute. Allowing three minutes as an average time for the shower running for each bather, the water consumption in the shower bath was about 21.375 United States gallons.

In other words, the proportion between water used in the ordinary bathtub and water used for the spray bath would be as 45 to 21.375, or more than twice as much for the bathtub.

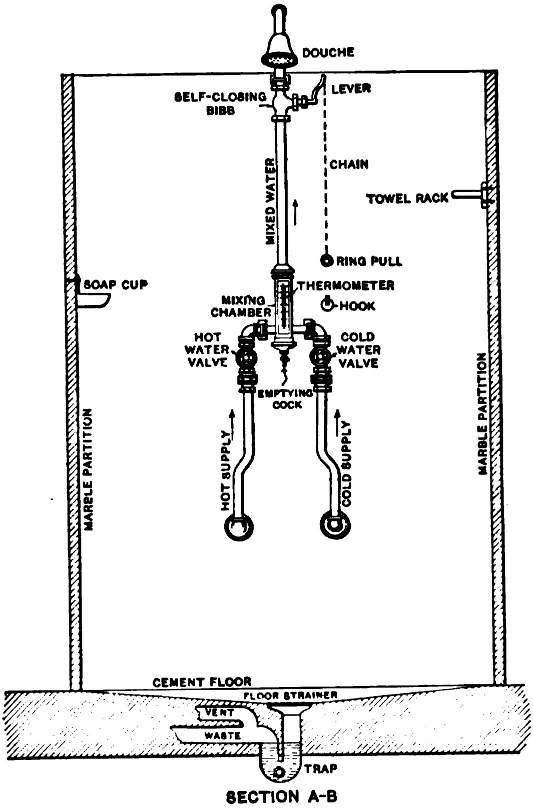

DOUCHE
SELF-CLOSING BIBB
LEVER
CHAIN
MIXED WATER
TOWEL RACK
RING PULL
SOAP CUP
THERMOMETER
MIXING CHAMBER
HOOK
HOT WATER VALVE
COLD WATER VALVE
EMPTYING COCK
MARBLE PARTITION
HOT SUPPLY
COLD SUPPLY
MARBLE PARTITION
CEMENT FLOOR
FLOOR STRAINER
VENT
WASTE
TRAP
SECTION A-B

FIG. 27a. ELEVATION OF RAIN BATH IN THE HEBREW INSTITUTE, N. Y.

Baths in the Hebrew Institute — This building, designed by Brunner & Tryon, architects, is located in the eastern portion of the lower part of New York City. It is intended for similar purposes as the Cooper Institute, and contains a large assembly room, with stage, class rooms, a reading room and library, a workshop and gymnasium.

The rain or shower baths are located on the top floor, and there are five of these. The floor is made of artificial stone (flintolithic pavement), and is raised one step above the general floor level.

The bath compartments are very roomy, each measuring about 4 x 5 feet. (See Fig. 27a and b.) The walls are lined to a height of 6 feet with blue-veined Italian marble slabs. There are in front of each bath a cloth curtain to prevent splashing, and a light lattice door of wood. In this compartment the bathing under the shower is done; the undressing and dressing are done in an adjoining large room with lockers.

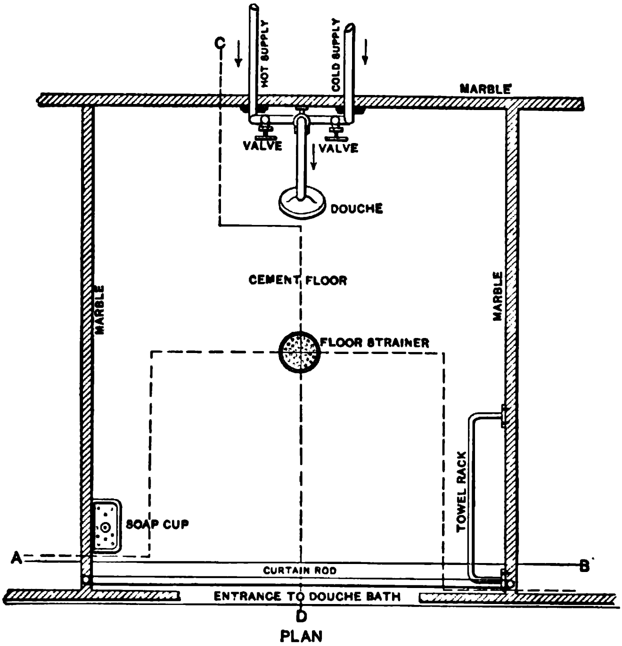

C
HOT SUPPLY
COLD SUPPLY
MARBLE
VALVE
VALVE
DOUCHE
CEMENT FLOOR
MARBLE
MARBLE
FLOOR STRAINER
TOWEL RACK
SOAP CUP
A
B
CURTAIN ROD
ENTRANCE TO DOUCHE BATH
D
PLAN

FIG. 27b. PLAN OF RAIN BATH IN THE HEBREW INSTITUTE, N. Y.

The sprays and pipes are of nickel-plated brass. Each spray stands at the proper angle of inclination at a height of about 7 feet from the floor, and is controlled by a self-closing cock with chain and pull attached. The bather turns on the cold water himself, and tempers it to the desired temperature by turning on the hot water. Each mixing chamber has a thermometer attached. While bathing the chain and pull are hooked up so as to leave both hands of the bather free. The water is supplied from two large tanks located on the roof of the building.

Hot water is obtained from a Tobey hot-water heater, located in the basement, and heated by steam from the heating boilers. This heater differs from ordinary hot-water tanks in having an automatic steam shut-off, operated by means of an adjustable expansion rod in the top of the heater. It is very economical in the use of steam, for when no hot water is drawn the steam valve closes automatically. A lock nut and screw on the end of the expansion rod can be so set and regulated as to open the steam valve much or little as may be desired, and thus the desired temperature of the hot water can be regulated at the heater; that is, the heater can be adjusted to give hot water of any desired temperature (within certain limits). Overheating of the water may thus be prevented, and there is consequently no danger of scalding a person by hot water.

The rooms are lighted by both electric incandescent and gas lights. The heating is accomplished by direct steam radiators. Ventilating registers are set in the walls, connecting with large outlet flues. All plumbing relating to the baths is arranged in conformity with the rules of the New York Board of Health.

Baron de Hirsch Fund Baths — These baths, erected by the trustees of the Baron de Hirsch Fund, were located in a leased corner building in the eastern end of lower New York City, the basement and street floor being transformed into a bath house after plans and specifications prepared by the writer.

The street floor is intended for women and the basement for men.

Provision is made for fifteen spray baths for men and fifteen baths for women; but of these there were originally put up nine baths for men and eleven baths for women. (See Fig. 28.) Besides the spray baths, the street floor contains one bathtub for invalids' and children's use, two water-closets, one slop sink, and one drinking trough. The basement contains one drinking trough, one slop sink, a water-closet and a urinal, two hot-water heaters and a large hot-water tank. Each floor contains a small office, with railing, desk and chair, where the tickets are sold. Baths for adults, with soap and towel, cost five cents; and for each child a charge of two cents was made.

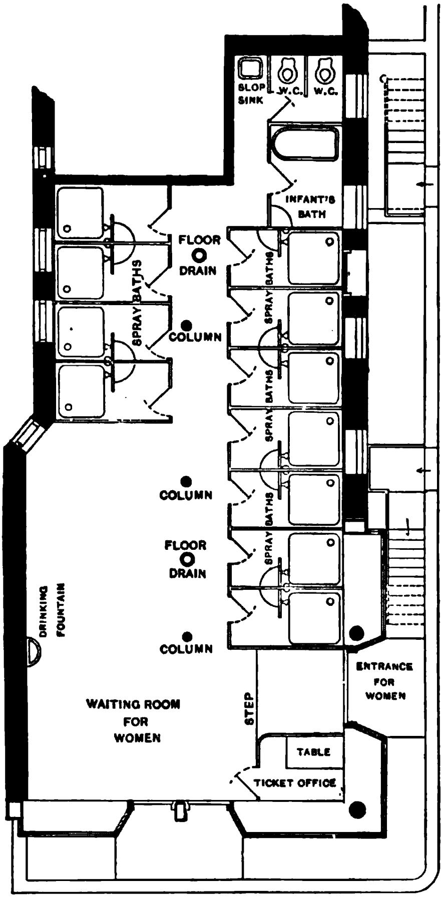

SLOP SINK
W.C.
W.C.
INFANT'S BATH
FLOOR DRAIN
SPRAY BATHS
COLUMN
SPRAY BATHS
SPRAY BATHS
SPRAY BATHS
SPRAY BATHS
COLUMN
FLOOR DRAIN
DRINKING FOUNTAIN
COLUMN
ENTRANCE FOR WOMEN
WAITING ROOM FOR WOMEN
STEP
TABLE
TICKET OFFICE

Fig. 28. Plan of Baron de Hirsch People's Baths in N. Y.

The floor was made throughout of artificial cement stone, and all the rain baths have depressed basins, molded in cement for the bather to stand in. The arrangement of each bath was similar to that in the Demilt Dispensary, except that for all partitions and divisions galvanized corrugated iron was used instead of wood or marble. This galvanized corrugated iron was fastened to angle and T irons, and all ironwork was painted with five coats of special bath enamel, white in color. Each bath compartment contained, besides the rain shower, a soap cup and a hook to fasten the pull of the self-closing bibb. Each dressing compartment contained a hardwood seat and six enameled iron clothes hooks. The dimensions of each bath were approximately 8 feet deep by 4 feet wide, and the bath proper was 3½ to 4 feet deep and 4 feet wide.

Water was obtained by direct street pressure through a 1-inch tap and 2-inch galvanized wrought-iron service pipe, on which a 2-inch Thomson water meter was placed.

In these baths hot water was generated in two Hitchings hot-water heaters, and stored in a 400-gallon galvanized hot-water tank. From here the hot water was carried to a large mixing chamber of 30 gallons capacity, and the cold water was also carried to it, and the two were mixed here by the

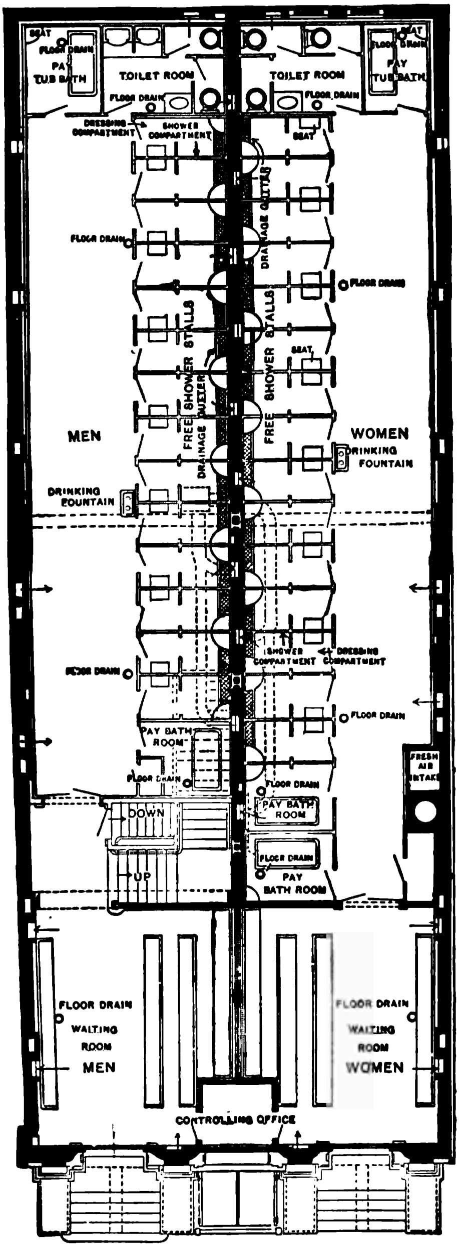

SEAT
FLOOR DRAIN
PAY TUB BATH
TOILET ROOM
FLOOR DRAIN
TOILET ROOM
FLOOR DRAIN
PAY TUB BATH
DRESSING COMPARTMENT
SHOWER COMPARTMENT
SEAT
DRAINAGE GUTTER
FLOOR DRAIN
FREE SHOWER STALLS
DRAINAGE GUTTER
FREE SHOWER STALLS
SEAT
MEN
WOMEN
DRINKING FOUNTAIN
DRINKING FOUNTAIN
SHOWER COMPARTMENT
DRESSING COMPARTMENT
FLOOR DRAIN
FLOOR DRAIN
PAY BATH ROOM
FLOOR DRAIN
FLOOR DRAIN
FRESH AIR INTAKE
PAY BATH ROOM
DOWN
UP
FLOOR DRAIN
PAY BATH ROOM
FLOOR DRAIN
WAITING ROOM
MEN
FLOOR DRAIN
WAITING ROOM
WOMEN
CONTROLLING OFFICE

FIG. 29. PLAN OF HICKS STREET PEOPLE'S BATHS IN BROOKLYN, N. Y.

bath attendant or janitor to the desired temperature, which was indicated by a special hot-water thermometer. The tempered water was carried to the sprays in each bath, so that the bather could not control the temperature himself. On the other hand, he could, by means of the self-closing bibb controlling the spray, open the latter and allow it to run as long as he wanted. This arrangement was adopted to obviate the necessity of having a large number of electric bells. All water pipes were of galvanized wrought iron, and the sprays of copper, of special construction and shape.

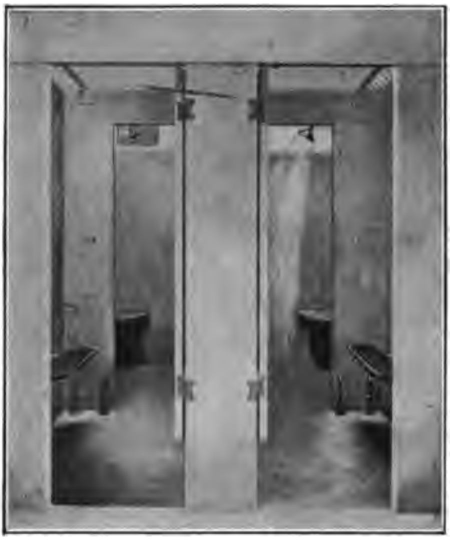


Fig. 30. Interior View, Showing Dressing and Bath Compartments, in Hicks Street People's Baths.

Cold water was supplied directly to the drinking troughs, water-closets and the urinals, also to hose bibbs for washing the entire floor. Both hot and cold water were supplied to the slop sinks and to the ordinary bathtub for children's use.

Each floor had two floor cesspools to remove water from floor washing. The best sanitary fixtures and appliances were used throughout: porcelain hopper closets, with flush operated automatically by seat action; porcelain urinal with intermittent automatic flush; porcelain glazed rim slop sinks and porcelain drinking troughs. The bathtub was of enameled iron, with glazed rolled edge, and stood on high legs. All walls, ironwork, pipes, the slop sinks and the tubs, etc., were painted with five coats of white bath enamel paint.

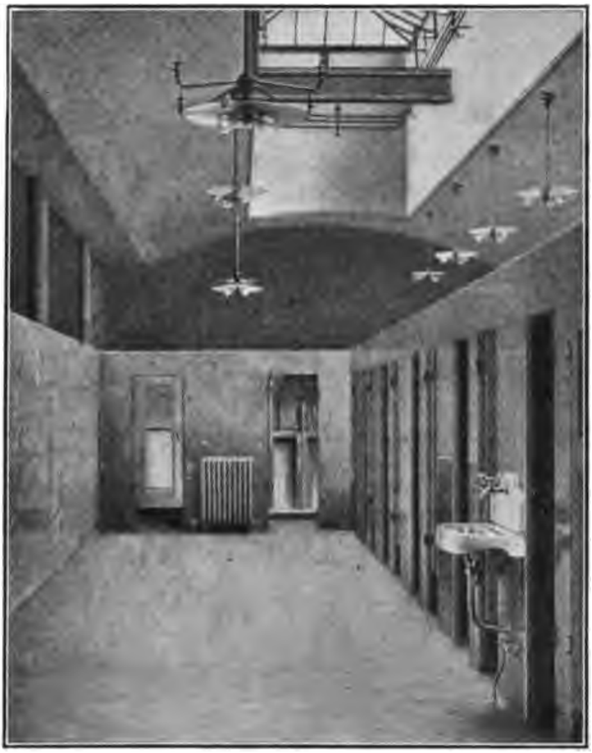
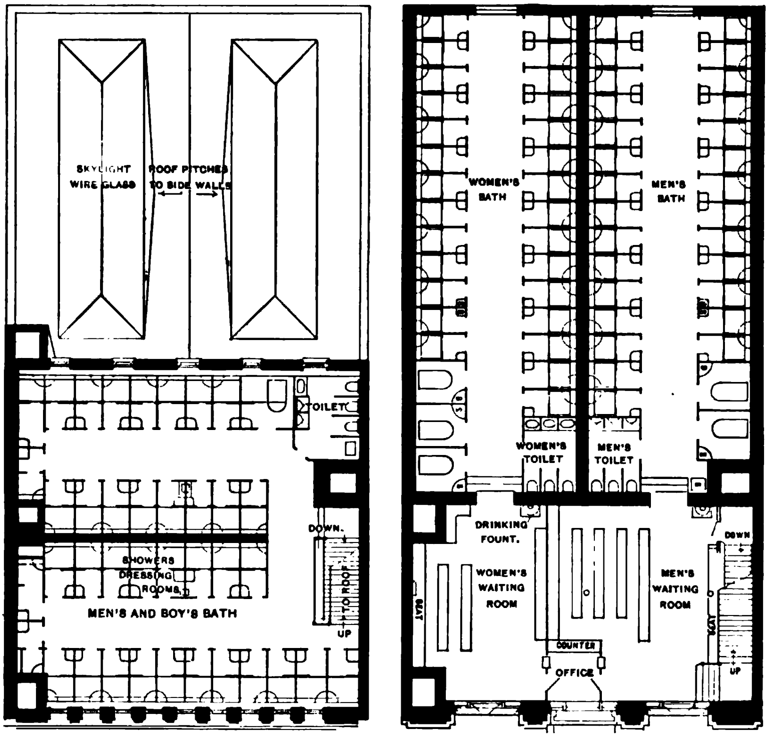


FIG. 31. INTERIOR VIEW, SHOWING CORRIDOR IN MEN'S BATHS, HICKS STREET PEOPLE'S BATHS.

All the plumbing conformed to the New York Board of Health regulations.

The rooms were lighted with gas — electric light not being available in the district — and the heating was done by means of direct hot-water radiation. Efficient ventilation was provided by means of a large 16 x 24 inch galvanized iron flue, inside of which the 11-inch round smoke pipe from the heaters was carried to the top of the roof of the building. From this flue branch vent ducts were carried to each floor.


SKYLIGHT
WIRE GLASS
ROOF PITCHES
TO SIDE WALLS
TOILET
DOWN.
SHOWERS
DRESSING
ROOMS.
MEN'S AND BOY'S BATH
ROOF
UP
WOMEN'S
BATH
MEN'S
BATH
WOMEN'S
TOILET
MEN'S
TOILET
DRINKING
FOUNT.
WOMEN'S
WAITING
ROOM
MEN'S
WAITING
ROOM
SEAT
SEAT
COUNTER
OFFICE
DOWN
UP

SECOND-FLOOR PLAN

FIRST-FLOOR PLAN

Fig. 32. First and Second Floor Plans of Pitkin Avenue People's Baths, Brooklyn, N. Y.

Fig. 29 shows the street-floor plan of a people's bath house (the Hicks Street bath), as recently erected in Brooklyn. As the illustration shows, there are separate entrances and waiting rooms for men and women, with one controlling office for the bath attendants in front. There are fourteen spray baths and two tub baths for men and fifteen spray baths and three tub baths for women. Separate toilet rooms are provided at the end of the large bathroom corridor. The second floor (not shown) contains the spray baths for boys. Figs. 30 and 31, taken from a circular on "People's Baths," issued by the J. L. Mott Iron

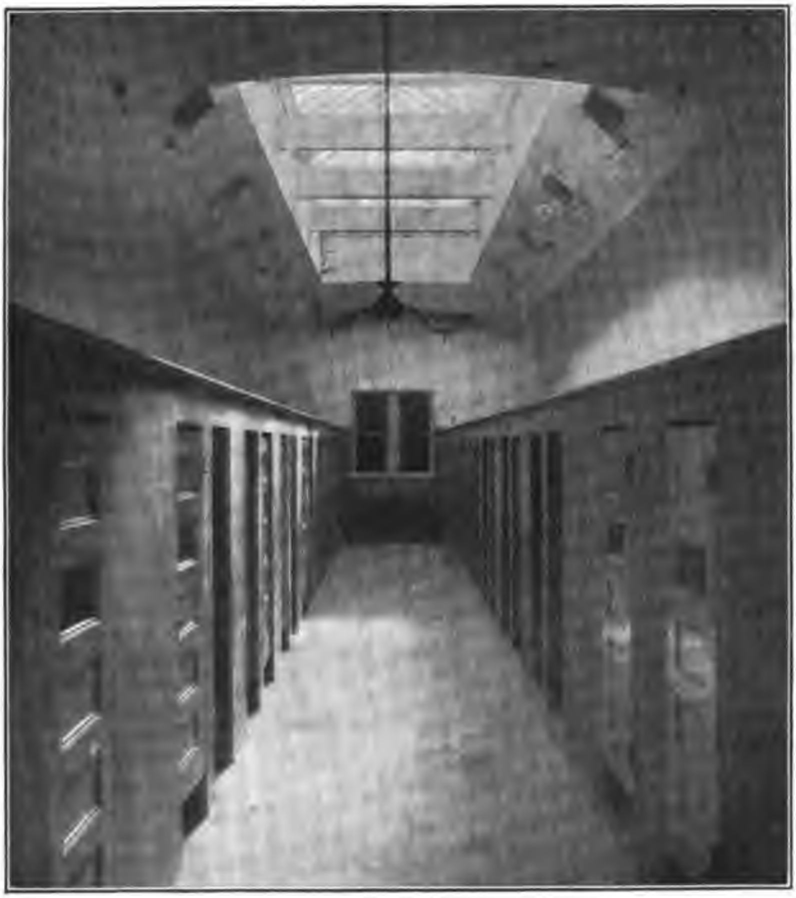


FIG. 33. INTERIOR VIEW ALONG CORRIDOR, IN PITKIN AVENUE PEOPLE'S BATHS, BROOKLYN, N. Y.

Works, give interior views of this bath house. Fig. 30 shows a view of two adjoining spray baths, the spray in one room being kept running. The front compartments are used as dressing rooms and are fitted with plain wooden seats. Quarter-circle seats are also provided in the bath compartments for the bathers to rest while washing their feet.

Fig. 31 shows a view of the wide corridor, on which the doors of the spray bath compartments open. A drinking-water fountain is provided for the use of the bathers; the compartment at the right-hand end of the corridor is the men's toilet room. A large skylight serves to furnish daylight illumination and to ventilate the entire apartment, which after dark is lighted up by a series of electric cluster lights with reflectors.

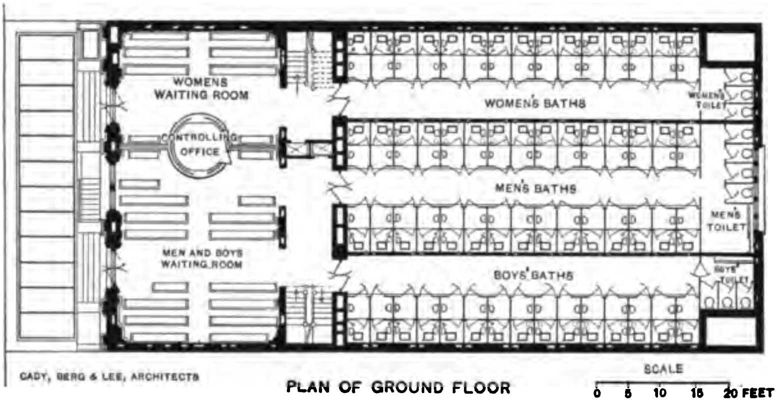

WOMENS WAITING ROOM
CONTROLLING OFFICE
WOMEN'S BATHS
WOMEN'S TOILET
MEN'S BATHS
MEN'S TOILET
MEN AND BOYS WAITING ROOM
BOYS' BATHS
BOYS' TOILET
CADY, BERG & LEE, ARCHITECTS
PLAN OF GROUND FLOOR
SCALE
0 5 10 15 20 FEET

Fig. 34. Plan of Ground Floor of a Large People's Bath House, Proposed for New York City.

In Fig. 32 I illustrate both floor plans of the recently completed municipal people's bath house of Brooklyn, located at Pitkin Avenue. This, like the Hicks Street bath, has separate entrances for men and women, and from the men's side a staircase leads to the second floor, which is ordinarily used for boys, but may be devoted to men bathers on days of unusually large attendance. The women's side contains twenty-eight spray baths and three tub baths, the men's side twenty-eight spray baths and two tubs, the boys' floor thirty-eight spray baths and one tub.

Fig. 33 is an interior view of the bathroom corridor, showing the spray-bath compartments located on both sides of the same. All the dividing partitions in this bath are of alberene stone, and the view is from a photograph kindly furnished to me by the Alberene Stone Company.

Both the Hicks Street and the Pitkin Avenue bath houses are again referred to in Chapter VIII, where their dimensions and cost are also given.

In Fig. 34 I illustrate the ground-floor plan of a larger people's bath house, designed by Cady, Berg & See, architects, with three divisions on the same floor, one for men, one for women and a third for boys. The men's baths are about twice as large as those for women, and contain double the number of spray baths. No tub baths are installed on this floor.

CHAPTER VIII

PEOPLE'S BATHS — (*Continued*)

THE first rain baths, erected in the city of New York, and mentioned in the preceding chapter, demonstrated almost at once the practical success of the system, and the construction of some larger public bath establishments followed soon after.

Among bath houses in New York should be mentioned a large one in Rivington Street, completed in 1901, after a much delayed erection, and opened to the public in March, 1901.

A *résumé* of the practical value in municipal sanitation of the rain bath, from a medical point of view, appeared as an editorial, by Dr. Geo. F. Shrady, in the "New York Medical Record" of June 22, 1895.

The value of people's rain baths in promoting civic cleanliness was also pointed out by the writer in two reports on "People's Baths," which he prepared in August and November, 1895, while honorary consulting engineer of the Brooklyn Health Department.* The substance of these reports appeared as an article, written by him at the request of the editor of "Public Improvements," in 1895. The following is an abstract of these reports and paper:

PEOPLE'S RAIN BATHS

While it is true that dwelling houses are fitted up in no other country with more comfort and convenience than in the United States, large sums being expended in the installation of plumbing and bathing fixtures, it is nevertheless a fact that even here the dwellings of the poor, the tenement houses in particular, lack bathing facilities.

As a proof for this statement I cite from the Seventh Special Report of 1894 of the United States Commissioner of Labor, on "The Slums of Baltimore, Chicago, New York and Philadelphia," the following facts:

Of 480 houses in the slum districts of New York only 17 had bathrooms.
Of 378 houses in the slum districts of Philadelphia only 67 had bathrooms.

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* This report was made before any people's baths were built in Brooklyn.

In New York	97.67	per cent of families in tenements had no bathrooms.
In Baltimore	92.65	" " " " " " " " "
In Chicago	97.67	" " " " " " " " "
In Philadelphia	83.10	" " " " " " " " "

The New York Tenement Commission Report of 1894 states that out of 255,000 inhabitants of tenements inspected under their supervision, only 306 had bathtubs in the houses where they lived. In a typical tenement block of Philadelphia there was one tub to 155 people.

The State of New York was the first State where the sanitary disadvantages, due to lack of bathing facilities for the masses, were provided for by the Laws of 1895, Chapter 351, approved by the Governor of the State on April 18, 1895.

This legislative act contemplates the establishment of bath houses, which shall afford ample facilities for cleansing the body, cleanliness being important for the maintenance of health of a city population.

The New York Bath House Act applies to the following seven cities of the State, viz.:

Greater New York,	with an estimated population of	3,545,899 (1899).
Buffalo,	" " " " "	400,000
Rochester,	" " " " "	178,000
Syracuse,	" " " " "	136,000
Albany,	" " " " "	101,000
Troy,	" " " " "	64,000
Utica,	" " " " "	58,500

The City of Buffalo erected a public bath house, containing twenty baths, which was open to the public in the year 1897, and which was at once well patronized by workingmen. Another bath house has since been added. In Rochester a public bath house has recently been completed and the first week over 1,000 people used it. The cities of Albany and Syracuse have plans under consideration, and in Troy the matter was agitated, and a bath house was opened in 1901, containing 24 sprays.

Of the smaller cities, not coming under the provisions of the mandatory act, the City of Yonkers has distinguished itself by being the first city to establish a municipal bath house, and by erecting two people's baths, but we have heard nothing yet from cities like Newburg, Poughkeepsie, Elmira, Binghamton, Oswego, Kingston, Schenectady or Auburn, in all of which a public bath house, however small, would, doubtless, promote the public health.

Before the City of Brooklyn was combined by annexation with New York (1898), the writer, who held the position of honorary consulting engineer to the Health Department, submitted in August and November, 1895, to the Health Department reports, with preliminary plans on the question of erecting people's baths in Brooklyn.

In the establishment of public bath houses contemplated by the act, the first question which naturally arises is, what system or form of bath shall be adopted? The act is, obviously, not designed to provide baths for pleasurable exercise, nor baths merely for the cooling and refreshing of the body, such as swimming baths.

Generally speaking, we may distinguish three systems of baths for bath houses, viz., the swimming bath, the tub bath and the spray or shower bath.

Of these the first, the swimming bath, is not a cleansing bath, in the sense of the above act. In a swimming bath the use of soap is not, and cannot be, permitted. The large and luxurious marble or tile-lined tank or plunge is not intended for cleansing purposes. Moreover such baths are expensive to build, and require large quantities of both cold and warm water. They, furthermore, require preliminary cleansing baths, in which persons must soap and scrub themselves, before being permitted to enter the pool of clean water. All this involves increased expense, both in first cost and in maintenance, therefore the swimming bath is almost out of the question for free people's baths.*

The second form of bath, namely, the tub bath, is also unadapted, and this for the following reasons, viz.:

(1) Cheap tubs, such as zinc or copper lined tubs, soon become dented in use, lose their polish and cleanly appearance, wear out quickly and have to be replaced at frequent intervals. Galvanized iron tubs have a rough surface and untidy appearance. Porcelain-lined or enameled iron tubs, which are better, are much more expensive, and the enamel surface — unless used with care, which in a public free bath house cannot be expected — is apt to chip or crack off. The best tubs, viz., glazed stoneware or heavy solid porcelain tubs, are clumsy and expensive, and require very large quantities of hot water.

(2) The maintenance of tubs and of bathtub fittings is likewise quite expensive.

(3) Tub baths require a good deal of space.

(4) With tub baths much time is lost in filling the tub, in tempering the water, in emptying the tub after the bath, and in cleaning and scrubbing the same after each use. During the rush hours there would be a good deal of temptation for the bath attendants to neglect the thorough cleaning of the tubs.

(5) Tub baths require provision for a large quantity of water, and proportionately much hot water; hence they are expensive in the consumption of fuel for heating the water.

(6) Bathing in tubs requires a good deal of time for each bather.

(7) When unclean, dusty or soiled persons take a bath in a tub bath, their bodies are very soon immersed in dirty water, and in order to become clean they necessarily have to empty and refill the tub several times, which means a greatly increased water consumption.

(8) In the use of tub baths in free public baths there is some *real*, not merely a fancied, danger of transmission of skin or contagious diseases from one person to another.

(9) Finally it is a fact, well known to physicians, that bathing in tubs has often a debilitating effect.

I have enumerated the chief objections to tubs at length, because this matter is not generally understood. It is, for the reasons given, an undisputed fact that tub baths are not well adapted as cleansing baths in people's bath houses.

* I say "almost" advisedly, because there are a few people's baths both here and in Europe which contain both shower or spray baths and swimming tanks.
W. P. G.

The third form of bath mentioned, namely, the *shower*, *spray* or *rain bath*, is by far the *best form* for free people's baths. It is economical, practical and efficient. It is also the simplest, quickest, cheapest, cleanest and in all respects best form of bath. It requires the least space, the least time, the least amount of water, the least amount of fuel for water heating, the least attendance and the least cost of maintenance. It cleanses, refreshes and invigorates the bather.

In all modern rain baths, simple showers or sprays of tepid water replace the discarded tub. The vertical descending stream from the shower being objectionable to some people, particularly women, the spray is placed inclined at such an angle as not to strike the head of the bather, except when he purposely places same under the stream.

The illustration, Fig. 9, shows in plan and vertical section the general arrangement of a single rain-bath compartment. Its width may be from 3 feet 6 inches to 4 feet 6 inches, and the depth from 7 to 9 feet. A dividing partition is placed between the dressing-room and the bath proper. The dressing-room contains a plain seat, some clothes hooks and a bootjack. The bath proper contains the apparatus for mixing or tempering the water, one of the most successful being the German so-called "Gegenstrom" apparatus, in which the water is warmed by steam. Sometimes the floor of the bath is molded in concrete so as to form a shallow basin or foot bath. A seat is also provided for the bather when washing his feet.

A study of the illustration and a visit to any public bath house fitted with sprays discloses the following chief advantages of the rain bath:

(*a*) Such a bath is always ready for use, it requires but little attendance and is, therefore, economical in management. No time is lost in filling and emptying the tubs; the water issues from the spray already tempered to the right degree, very little cleaning and scrubbing after the bath is required, hence the bath is economical in management.

(*b*) The rain bath is cheaper in first cost than tub baths. The expenses for maintenance and for repairs are considerably less. The entire apparatus required in fitting up rain baths is simple and not liable to get out of order.

(*c*) The rain bath requires less time in application, hence a larger number of persons can bathe in a given time.

(*d*) The space occupied by the spray bath is less than that required by tubs, hence more bathers can be accommodated in a given space.

(*e*) The rain bath requires much less water than a tub bath; it is therefore economical in fuel.

(*f*) The tepid or cool spray has a well-known mechanical and stimulating effect.

In a sanitary point of view, the following are matters of greatest importance: first, the body of the bather does not come at all in contact with the soiled water, and the water falling from the douche passes away almost as fast as delivered; second, there is no danger of communicating contagious diseases from one bather to another.

The people's rain bath is no longer an experiment. It has been used in Germany for many years as the cheapest and best form of people's bath, and has proven very popular and eminently successful. Like results have been obtained wherever it has been introduced in the United States, and it is destined to become the favorite method of bathing.

Some statistical figures, taken from the record of people's baths in various cities, and showing their use and growing patronage, are submitted as being of general interest. These figures prove conclusively that rain baths are exceedingly popular with the masses.

The Center Market Place Bath in New York, erected under the auspices of the New York Association for Improving the Condition of the Poor, on a lot 25 by 75 feet, completed in 1891, and opened in August, 1891, cost about $28,000 exclusive of the land. It contains 29 bath compartments and shows the following steadily increasing attendance:

From October,	1891–	September,	1892,	59,440	baths	42,722 men
						7,460 women
						9,258 children
" "	1892–	"	1893,	68,629	"	52,624 men
						8,267 women
						7,738 children
" "	1893–	"	1894,	80,537	"	59,908 men
						10,757 women
						9,872 children
" "	1894–	"	1895,	88,734	"	65,517 men
						12,581 women
						10,636 children
" "	1895–	"	1896,	93,808	"	69,428 men
						14,096 women
						10,284 children
" "	1896–	"	1897,	101,023	"	
" "	1897–	"	1898,	115,685	"	85,128 men
						15,128 women
						15,509 children

The total number of bathers, since the opening of the bath house, on Aug. 17, 1891, has been 618,360. The total expenses in eight years amounted to $38,213.29, and the receipts to $29,100.80, showing a deficit of $9,112.49, or an average of $1,139.06 per year. The average cost of a bath was 6.2 cents.

The Baron de Hirsch Fund Baths showed, in 1895, the following results: total number of bathers from date of opening (1892) to Jan. 1, 1895, was 199,308, as follows: men, 159,323; women, 39,985; of children no record was kept. From January to August, 1895, 34,331 baths have been taken. The largest number of bathers in one month was 9,256, the largest number in one day 712, the annual cost, including rent, over and above all receipts was $1,200.

In Chicago the monthly attendance at the Carter H. Harrison free baths, opened in 1894, situated on a lot 25 feet by 100 feet, which contain 18 showers and have a capacity of 2,600 persons per week, was in 1894 and 1895 as follows:

January	2,450	July	9,951
February	4,500	August	11,766
March	5,779	September	9,338
April	7,610	October	7,848
May	7,948	November	6,852
June	10,186	December	6,951

Total in one year, 91,379, of which 71,045 were males, and 20,334 females. From January, 1894, to June, 1896, 226,538 have been given.

A few statistics from rain baths in Germany are equally striking.

In Magdeburg a public rain bath had the following attendance:

From April, 1890–April, 1891, total	64,498	57,189 men 7,309 women
" " 1891– " 1892, "	69,946	59,013 men 10,933 women

The Municipal people's bath houses in Vienna, Austria, show a steady growth in popularity. In 1888 the first bath house was built, and in 1897 there were eleven bath houses, in which over a million of baths were taken. (See the article below.)

The total number of baths per year was as follows:

In 1888,	78,000	(1 bath house)
" 1889,	96,000	(1 " ")
" 1890,	144,000	(3 bath houses)
" 1891,	249,000	(4 " ")
" 1892,	342,000	(8 " ")
" 1893,	326,000	(9 " ")
" 1894,	663,000	(10 " ")
" 1895,	788,000	(10 " ")
" 1896,	841,000	(10 " ")
" 1897,	1,014,000	(11 " ")

In 1897 about one-fifth of all bathers were women, the greatest percentage of women was 25.3.

The largest frequency, 15.6 per cent of the total annual number of baths, occurred in June; the least frequency, 4.2 per cent, in January. The largest number of baths were taken on Saturdays (nearly 33⅓ per cent), and next comes Sunday forenoon with 20 per cent.

In Berlin the people's bath house of the Oranienburg suburb shows the following statistics:

1888–1889	spray	baths	21,065	19,032 men 2,033 women
1889–1890	"	"	25,194	23,233 men 1,961 women
1890–1891	"	"	22,370	20,882 men 1,488 women
1891–1892	"	"	22,386	21,433 men 953 women
1892–1893	"	"	24,828	23,771 men 1,057 women
1893–1894	"	"	30,251	29,129 men 1,122 women
1894–1895	"	"	34,306	33,317 men 989 women
1895–1896	"	"	36,202	35,043 men 1,159 women

It will be noticed that comparatively few women took spray baths, and this may be explained by the fact that the above bath house is also provided with tub baths, which were comparatively more frequented by women than by men.

The statistics of the number of spray baths taken in the Karl Müller People's Baths, of Munich, furnish a striking example of the increasing popularity of spray baths. The figures are as follows:

During 8 months of the year	1901	45,288	baths were taken.
" the year	1902	86,107	" " "
" " "	1903	96,616	" " "
" " "	1904	101,897	" " "

The details of the planning and interior arrangements of public baths open the entire year may be modified in many ways to suit special conditions of site, size of lot, etc.

In general, it is a well-established fact that a larger number of small bath houses, suitably distributed, are better than one or a few centrally located large bath houses.

Concerning the provision for the two sexes, it is in my judgment better to establish separate bath apartments for men and women, rather than have separate hours or days assigned to them, for the women and girls who would patronize the baths are likely to be employed during the same hours as the men. More bath compartments should be provided for male than for female bathers, as experience everywhere shows that the men prefer the shower baths more than the women.

The exterior of people's bath houses should be plain and without any lavishness in design, yet easily recognizable (Fig. 36); the construction should be substantial, economical, and above all cleanly, sanitary and inviting. There should be vestibules and waiting-rooms, separate for men and women, also a ticket office, a number of bath and dressing apartments and toilet-room conveniences. For the use of the management there should be rooms for male and female attendants, closets for towels and soap, broom and pail closets, a boiler-room, a laundry, a drying and ironing room, also a place for storage of fuel. (See Fig. 35.)

In view of the existing lack of bathing facilities in the houses of the poorer classes of our population, it is of the utmost importance that simple, cheap and unpretentious bath houses be provided, particularly in the crowded tenement districts. Where facilities for bodily cleanliness are offered, an improved state of health in a community is sure to follow. The expenditures required for the establishment and maintenance of free public baths should therefore be considered as being quite as appropriate and necessary in the interest of the public health, as the money expended for street cleaning, sewerage, water supply and garbage disposal.

Regarding the cost of people's bath houses, constructed on the rain-bath principle, exact estimates can only be given for definite sizes of buildings and building sites. In a general way it may be said that a two-story bath house, on a

50-foot by 100-foot lot, capable of furnishing baths for from 2,000 to 3,000 persons per day, could be constructed and equipped for about $40,000. A two-story bath house, on a 25-foot lot, would cost about $25,000, exclusive of the cost of the land.*

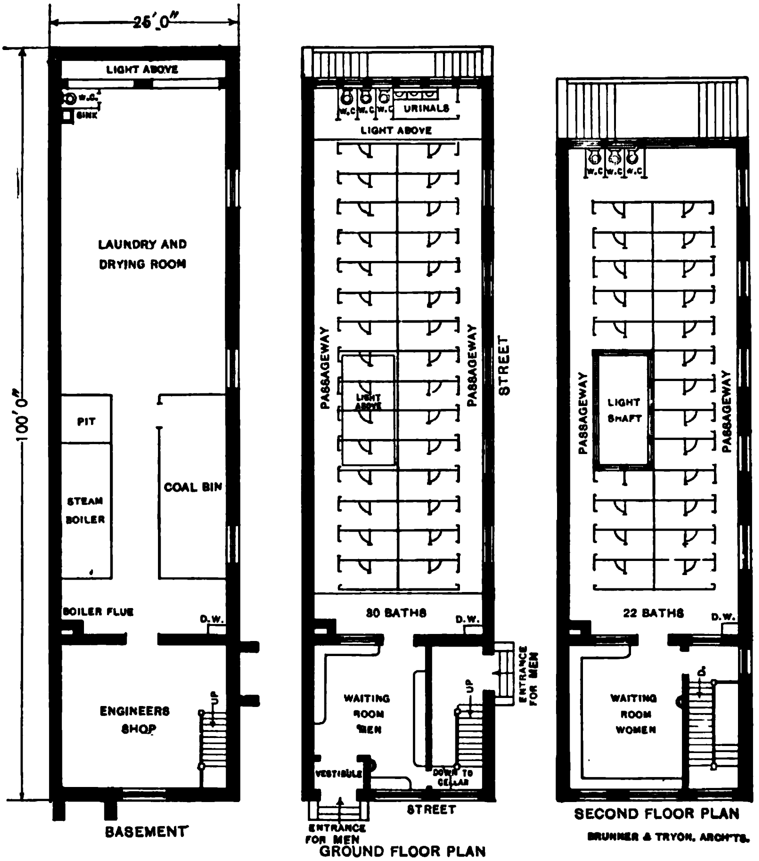
25'0"
LIGHT ABOVE
W.C.
SINK
LAUNDRY AND DRYING ROOM
100'0"
PIT
STEAM BOILER
COAL BIN
BOILER FLUE
D.W.
ENGINEERS SHOP
UP
BASEMENT
W.C W.C W.C
URINALS
LIGHT ABOVE
PASSAGEWAY
LIGHT ABOVE
PASSAGEWAY
STREET
30 BATHS
D.W.
ENTRANCE FOR MEN
WAITING ROOM MEN
UP
VESTIBULE
DOWN TO CELLAR
STREET
ENTRANCE FOR MEN
GROUND FLOOR PLAN
W.C W.C W.C
PASSAGEWAY
LIGHT SHAFT
PASSAGEWAY
22 BATHS
D.W.
WAITING ROOM WOMEN
UP
SECOND FLOOR PLAN
BRUNNER & TRYON, ARCH'TS.

FIG. 35. PLAN OF A PROPOSED TWO-STORY PEOPLE'S BATH HOUSE.

Since 1900 a number of other people's baths were provided in New York City, such as the East 38th Street baths and those in the Thomas Jefferson and Seward Park Pavilions, for all of which the writer furnished the plans and specifications.

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* It should be noted that since the report was made the prices for material and labor have advanced in some cases as much as 50 and 60 per cent, which explains the higher cost of the more recent bath houses, spoken of later on in this chapter.
W. P. G.

In Brooklyn, too, several people's bath houses were erected by the municipality, among these being the Hicks Street baths, opened up in September, 1903, of which Figs. 29, 30 and 31 show the plan and some interior views, and the Pitkin Avenue bath, opened up in October, 1903, of which Fig. 32 is a plan and Fig. 33 an interior view. Mr. A. S. Hedman was the architect for both bath houses.

The Hicks Street bath house is located on a lot 35 feet 8 inches by 97 feet 6 inches; it contains altogether twenty-nine showers for men and women on the ground floor, and twenty-nine showers on the second floor for boys. The cost was $54,564. The Pitkin Avenue baths are located in a densely settled section of the Borough, on a lot 50 feet by 100 feet. The building is two and one-half stories in height, and cost, exclusive of the land, $79,300. The first floor contains twenty-eight showers for men and twenty-eight showers for women, also five tub baths and toilet rooms. The second floor, which is 50 feet square, contains thirty-eight showers and one bathtub for boys, also some toilets. The drainage of the compartments is by means of open gutters. Three similar additional bath houses, the construction of which cost about $100,000 each, were opened in 1904 and 1905.

In February, 1902, appeared a "Communication on a System of Municipal Baths for Manhattan, by the New York Association for the Improvement of the Condition of the Poor," from which I abstract the following interesting data:

The location of people's baths should be in the center of the most densely populated city districts. The endeavor should be to provide the largest possible bathing capacity on the smallest possible site where land is expensive. The materials used in the construction and interior equipment of the baths should be such as to permit of the highest degree of sanitary cleanliness. The exterior should be simple, but reasonably attractive and permanent in character.

The report contains two plans for baths, the first, called "Type

A," being for a building on a lot 25 feet by 100 feet; the second, or "Type B," being for a lot 50 feet by 100 feet.

Type A provides for a main floor, with men's waiting room and with thirty showers, three tubs and toilet-room conveniences; the second floor, extending back half of the depth of lot, is intended for women and children and contains fifteen showers, three tubs and toilets. The basement is occupied by the steam and engine plant. There are no living quarters and no laundry.

Type B has the first floor divided equally between men and women, but the waiting room for men is made larger than that for women. It provides twenty-nine showers and three tubs for men, the same number for women, also separate toilet rooms. The second floor is for men only, and contains thirty-eight showers and one tub, besides toilet fixtures. The second floor can be shut off entirely at seasons when the patronage is light.

The lowest estimates obtained for erecting such bath houses were: for Type A, $43,442, and for Type B, $76,850.*

The average cost of lots is as follows: lot 25 by 100 feet, $16,687; lot 50 by 100 feet, $34,562.

The report also contains the following interesting tabulation:

NAME OF BATH.	Size of Lot.	Ground Area, Sq. Ft.	Bathing Capacity (Units).	No. of Sq. Ft. to Each Unit.	Cost Exclusive of Land.	Cost per Sq. Ft.	Cost per Bathing Compartment.
Plan A	25′ × 100′	2,500	51	49	$43,442 (estim.)	$17.37	$852
Plan B	50′ × 100′	5,000	103	48.5	76,850 (estim.)	15.37	746
Rivington Street Bath . . .	80′ × 81′	6,480	77	84	100,000	15.43	1,300
People's Bath, Center Market Place	27′ × 58′	1,566	26	60	28,000	17.88	1,077
Dover Street Bath, Boston .	43′ × 110′	4,730	50	94.6	72,000	15.22	1,440
Philadelphia Bath	40′ × 60′	2,400	44	54.5	24,153	10.06	549
Baltimore, Walter Bath No. 1	40′ × 68′	2,720	24	113.3	21,000	7.72	875

From the table it appears that a bath house on a lot 50 feet wide is more economical in construction than one on a 25-foot lot.

---

* These large figures are explained by the present extraordinarily high prices for labor and material.

The average cost of annual maintenance is computed to be $12,975 for Type A bath, and $20,705 for Type B bath; hence it is in favor of Type B, because the cost of maintenance would amount to $254 for Type A, and to $201 for Type B, per bath compartment.

In accordance with the recommendations of the association named, it was decided by the city to erect a number of other baths on city lots 50 feet by 100 feet. Among these recent bath houses I mention the 41st Street, Allen Street, East 76th Street, East 109th Street baths and those in East 11th Street.

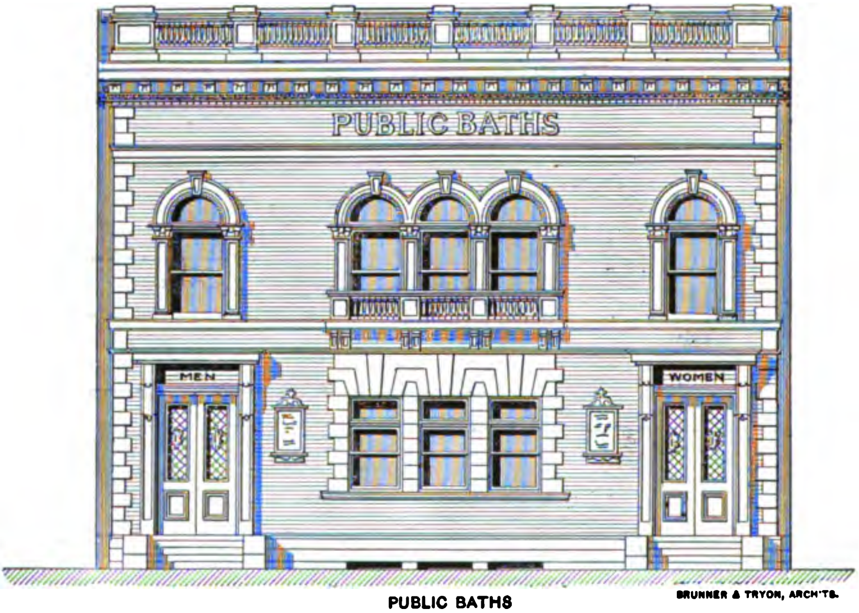
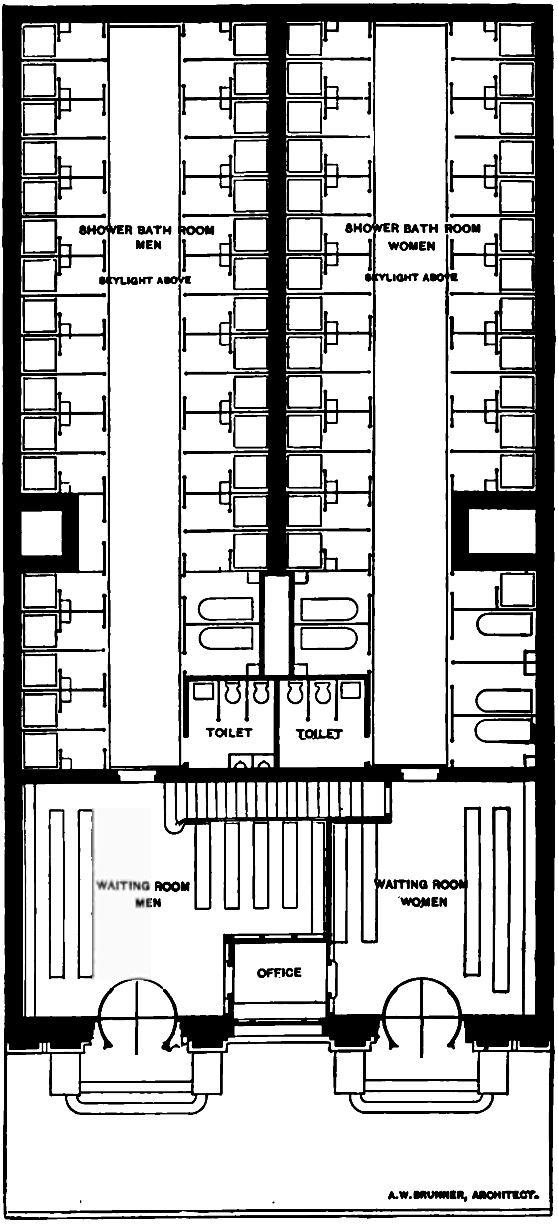


FIG. 36. ELEVATION OF PROPOSED PEOPLE'S BATH HOUSE.

The 11th Street baths, shown in ground-floor plan in Fig. 37, and of which Fig. 38 shows the detail of the bathing compartments, were completed in the year 1905. The water supply and plumbing in this bath were installed according to specifications


SHOWER BATH ROOM
MEN
SKYLIGHT ABOVE
SHOWER BATH ROOM
WOMEN
SKYLIGHT ABOVE
TOILET
TOILET
WAITING ROOM
MEN
WAITING ROOM
WOMEN
OFFICE
A.W. BRUNNER, ARCHITECT.

FIRST-FLOOR PLAN

Fig. 37. Plan of First Floor of Eleventh Street People's Bath House, in New York City.

and plans by the writer. This is the only bath in which the generally insufficient city water pressure on the second floor is taken into consideration, and in which provision is accordingly made for pressure and air tanks, supplied from steam pumps and air compressors.

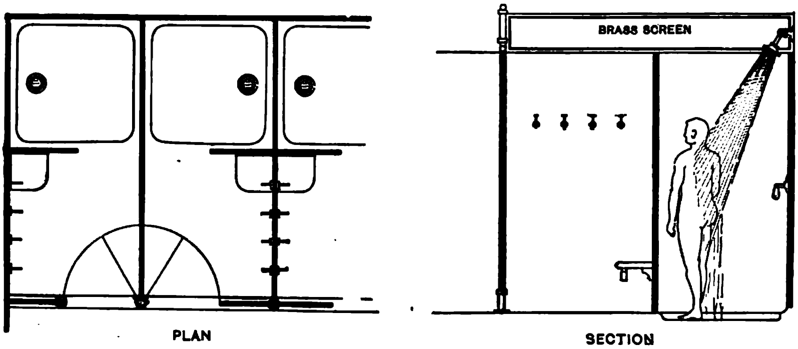


Fig. 38. Details of Bath Compartments in Eleventh Street People's Bath House, New York City.

A report (see opposite page), issued in 1906, by the Bureau of City Betterment of the Citizens' Union of the City of New York, of which the writer is a member, gives the following interesting data regarding the cost of some Manhattan and Brooklyn people's baths:

This report summarizes the people's baths question in the following words:

> "(1) People's bath houses should look and be clean, feel warm, smell sweet and be quiet and orderly.
>
> "(2) Bathing is a means of safeguarding the public welfare by the prevention of disease and by the raising of the standard of personal cleanliness and morality.
>
> "(3) By the maintenance of free public baths universal bathing is more nearly and most economically accomplished."

In recent years it has become more and more difficult to locate the floating summer baths along the river front of New York,

Name and Location of Bath House.	Cost of Site.	Cost of Building.	Total Cost.	Bath Units.	Maximum Number of Baths per Day.	Cost per Unit Exclusive of Site.	Cost per Unit Inclusive of Site.
MANHATTAN.							
Rivington St.	City Property	$100,000	$100,000	77	3,234	$1,298.70	$1,298.70
West 41st St.	$33,750	109,044	142,794	103	4,326	1,058.68	1,386.35
East 109th St.	19,000	118,781	137,781	129	5,418	920.78	1,068.00
Allen St.	35,332	99,109	134,441	98	4,116	1,011.00	1,372.00
East 11th St.	42,000	109,468	151,468	103	4,326	1,063.00	1,471.00
East 76th St.	11,000	113,641	124,641	113	4,746	1,006.00	1,103.00
				623			
West 60th St. (with swimming pool)	12,750	136,305	149,055	230	9,660	593.00	648.00
East 23d St. (with swimming pool)	City Property	273,052	273,052	154	6,468	1,773.00	1,773.00
				384			
BROOKLYN.							
Hicks St.	$3,750	$61,793	$58,043	63	2,646	$921.00	$981.00
Pitkin Ave.	4,000	88,456	84,456	96	4,032	880.00	921.00
Montrose Ave.	250	96,042	95,792	99	4,158	968.00	970.00
Huron St.	5,800	103,724	97,924	100	4,200	977.00	1,037.00
Duffield St.	13,500	110,993	97,493	99	4,158	985.00	1,121.00
				457			

Remarks.

	Incl. site	Excl. site
Actual cost per bath unit in Manhattan	$1,270	$1,043
Actual cost per bath unit in Brooklyn	1,009	949

In 1906 there were —

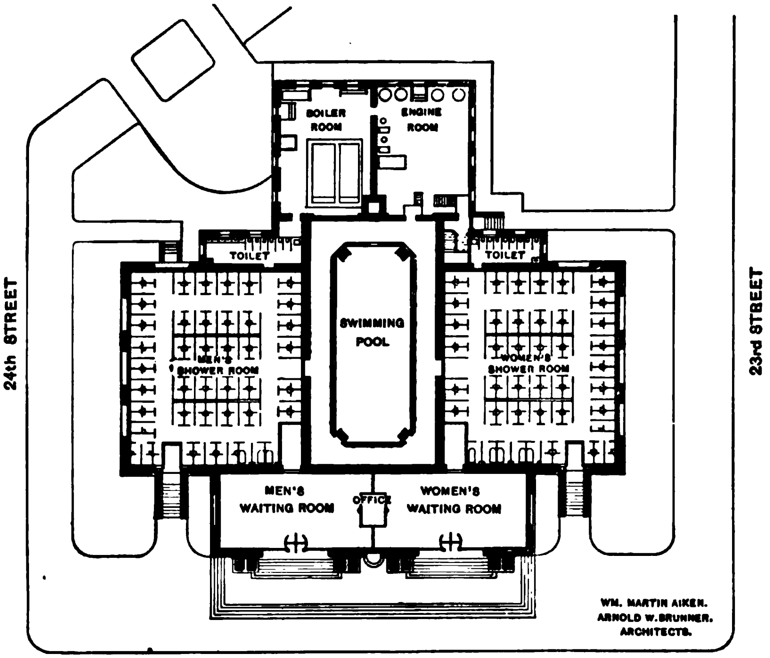
In Manhattan	623 bath units.
In Brooklyn	457 " "
	1,080 " "

Average length of time per bath, 20 min.

Each bath unit can, therefore, provide in 14 hours, 3 × 14 = 42 baths.

If all the bath units were in constant use 14 hours per day, 45,360 persons could take baths.

chiefly owing to the increasing pollution of the water. It was therefore decided to try the experiment of combining people's spray baths with public swimming pools. Two recent public baths in New York City are built on this plan, namely, the one in West 60th Street, opened in May, 1906, and the one in East 23d Street (see Fig. 39), for which latter the writer furnished plans and specifications. These baths are expected to be opened in the autumn of 1907. Fig. 40 shows an interior view of the swimming pool in the Cabot Street people's baths, in Boston.


BOILER ROOM
ENGINE ROOM
TOILET
TOILET
SWIMMING POOL
MEN'S SHOWER ROOM
WOMEN'S SHOWER ROOM
MEN'S WAITING ROOM
OFFICE
WOMEN'S WAITING ROOM
24th STREET
23rd STREET

WM. MARTIN AIKEN.
ARNOLD W. BRUNNER.
ARCHITECTS.

FIG. 39. PLAN OF 23D STREET PEOPLE'S BATH HOUSE, IN NEW YORK CITY.

Some descriptions of other American people's baths, like those of Yonkers, Philadelphia, Buffalo, Albany, Rochester, Boston, Pittsburg and Chicago, may be found in the technical papers, and also in the publications mentioned in the Bibliography. (See Chapter XVIII.)

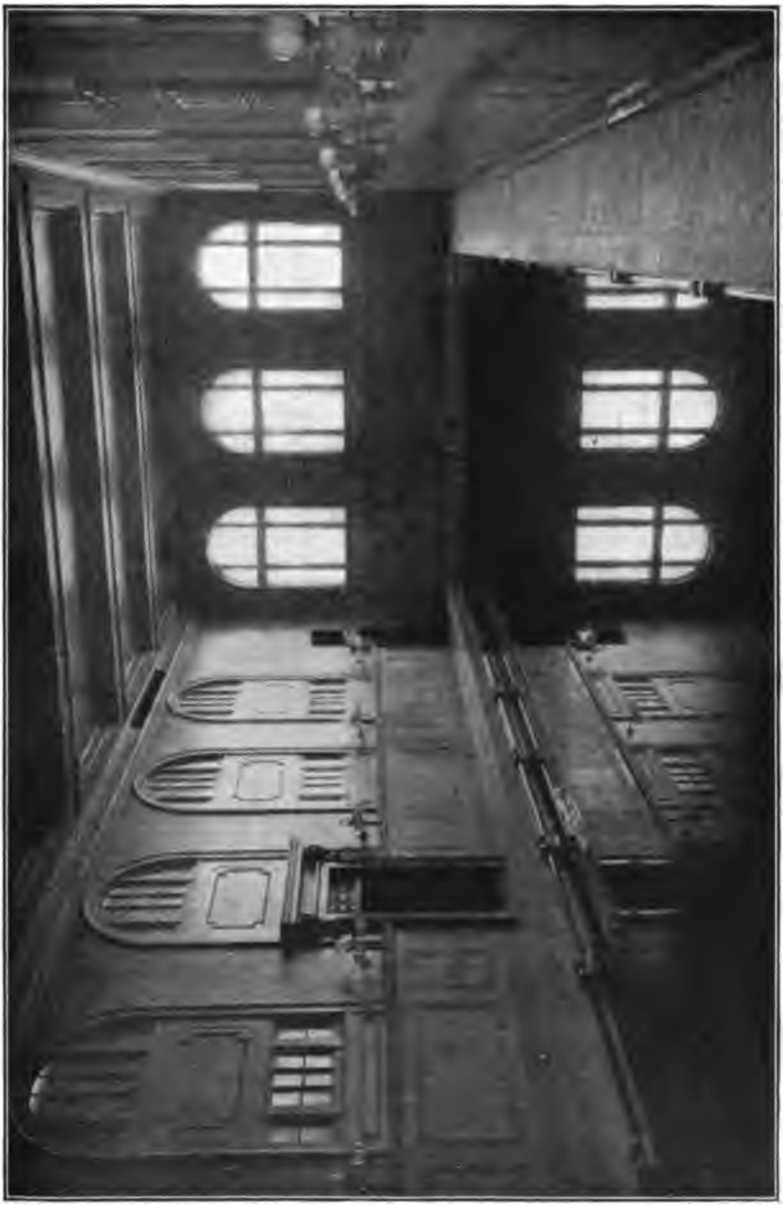


FIG. 40. INTERIOR VIEW OF CABOT STREET PEOPLE'S BATH HOUSE, IN BOSTON.

In Fig. 41 I submit the plan of a small one-story people's bath house, designed by me for a lot 30 by 60 feet in size, and containing ten spray-bath compartments for men and six for women. The building has separate entrances for men and women, one ticket office located between the two vestibules, two separate waiting rooms each about 15 feet square, with drinking fountains and with bench seats. Beyond the waiting rooms there are two corridors, 6½ feet wide, on which the sixteen bath compartments are located. Provision is also made for two water-closets and one urinal. Each bath compartment is 4 feet wide and 8 feet deep, and is divided into the bath proper, 4 feet by 4 feet, and the dressing room of same size as the bath. The opening between is to be provided with a curtain hung from a curtain rod. Each bathing compartment contains a single Gegenstrom apparatus and spray, and the bather turns on the water himself, controls the apparatus, and regulates the temperature of the water by means of a hot-water thermometer, by the gradual opening of the steam valve of the apparatus. The arrangement of each compartment in detail would be as shown in Fig. Each compartment has a separate waste pipe, and the floor is sunken and molded in form of a basin suitable for a foot bath.

Allowing thirty minutes for each bather, the capacity of such a bath house would be 16 × 2 = 32 baths per hour, or 32 × 12 = 384 baths per day. Allowing each spray to run on the average ten minutes, and to discharge 2½ gallons per minute, the consumption of water for each bather would be twenty-five gallons, or 384 × 25 = 9,600 gallons daily.

Fig. 42 illustrates a plan designed by me suitable for a larger people's bath house. The building is one story in height, and occupies a space of about 100 by 40 feet. It contains two entirely separate departments for men and women. The men's side contains sixteen rain baths, and the women's side eight rain baths and three tub baths besides a laundry and drying room for the bath towels. Separate large waiting rooms with seats and drinking fountain, and entrances for men and women, are provided;

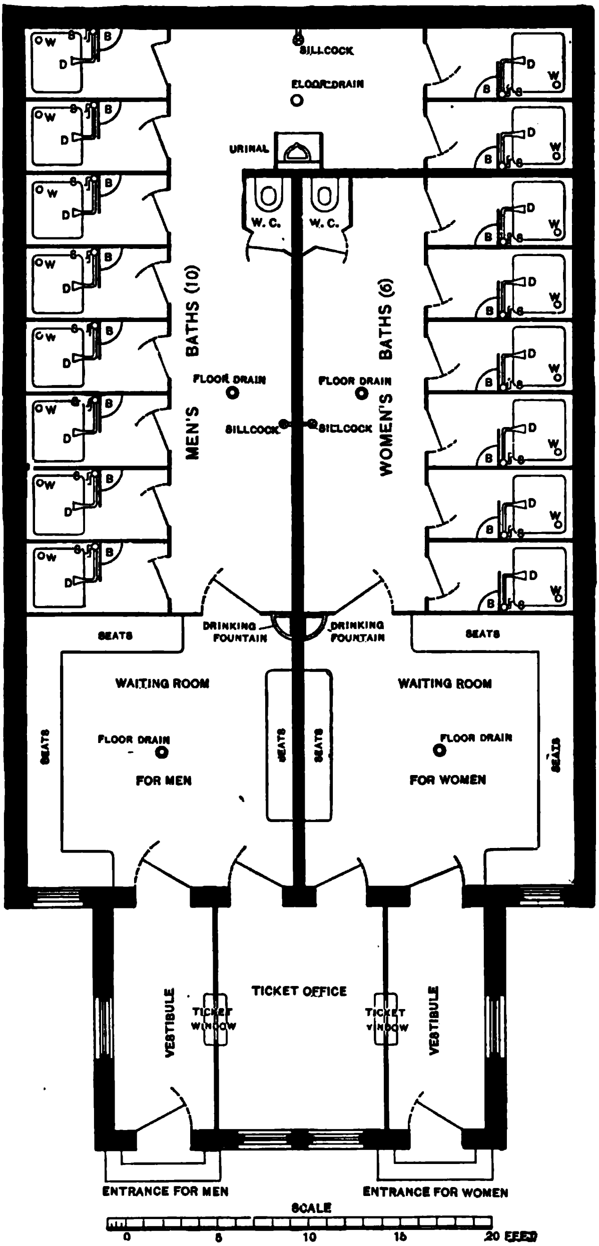

SILLCOCK
FLOOR DRAIN
URINAL
W. C.
W. C.
MEN'S BATHS (10)
WOMEN'S BATHS (6)
FLOOR DRAIN
FLOOR DRAIN
SILLCOCK
SILLCOCK
W
D
S
B
DRINKING FOUNTAIN
DRINKING FOUNTAIN
SEATS
SEATS
WAITING ROOM
WAITING ROOM
SEATS
SEATS
SEATS
SEATS
FLOOR DRAIN
FLOOR DRAIN
FOR MEN
FOR WOMEN
TICKET OFFICE
VESTIBULE
TICKET WINDOW
TICKET WINDOW
VESTIBULE
ENTRANCE FOR MEN
ENTRANCE FOR WOMEN
SCALE
0
5
10
15
20 FEET

FIG. 41. PLAN OF A SMALLER ONE-STORY PEOPLE'S BATH HOUSE.

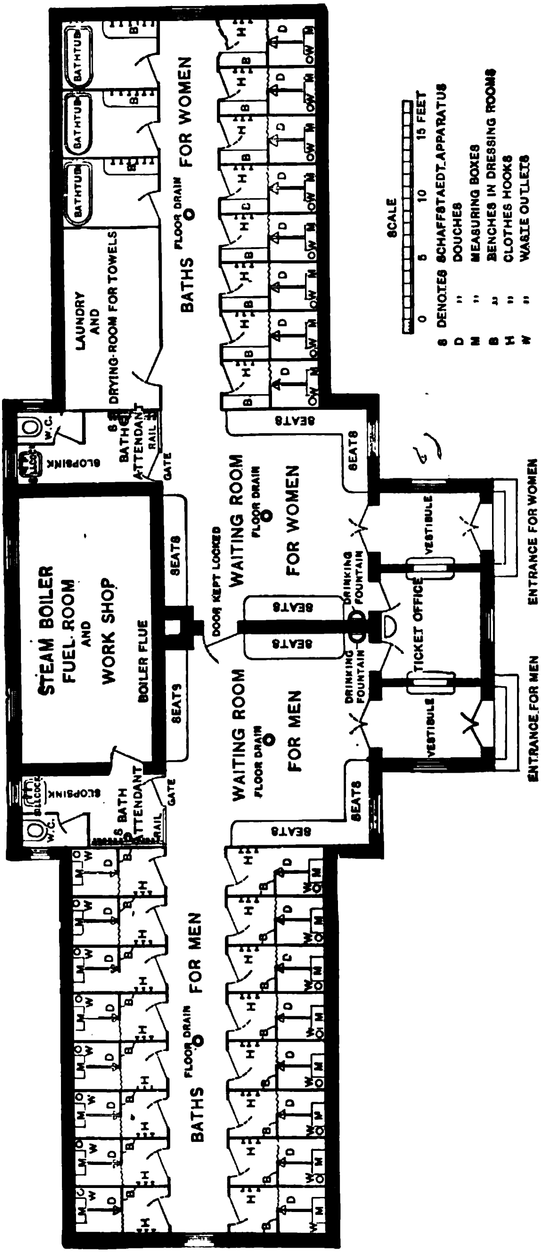

BATHS FLOOR DRAIN FOR WOMEN
BATHTUB
LAUNDRY AND DRYING-ROOM FOR TOWELS
W.C.
SLOPSINK
BATH ATTENDANT
RAIL
GATE
SEATS
WAITING ROOM FLOOR DRAIN FOR WOMEN
DOOR KEPT LOCKED
STEAM BOILER FUEL ROOM AND WORK SHOP
BOILER FLUE
DRINKING FOUNTAIN
TICKET OFFICE
VESTIBULE
ENTRANCE FOR WOMEN
ENTRANCE FOR MEN
WAITING ROOM FLOOR DRAIN FOR MEN
BATHS FLOOR DRAIN FOR MEN
SCALE
0 5 10 15 FEET
S DENOTES SCHAFFSTAEDT APPARATUS
D " DOUCHES
M " MEASURING BOXES
B " BENCHES IN DRESSING ROOMS
H " CLOTHES HOOKS
W " WASTE OUTLETS

FIG. 42. PLAN OF A PROPOSED ONE-STORY PEOPLE'S BATH HOUSE.

also room for steam boiler, for coal and fuel, for male and female attendants and water-closet accommodations.

In this case it is planned that the baths be supplied with warm water of 110° Fahr., by means of two large-size Gegenstrom apparatus, placed outside of the bath department, each capable of supplying sixteen sprays, and operated by a bath attendant In order to prevent waste of water, each bath compartment is fitted up with an overhead measuring box of capacity to suit the local requirements, which supplies the shower. There is also, in each compartment, a cold-water pipe with shut-off with which the

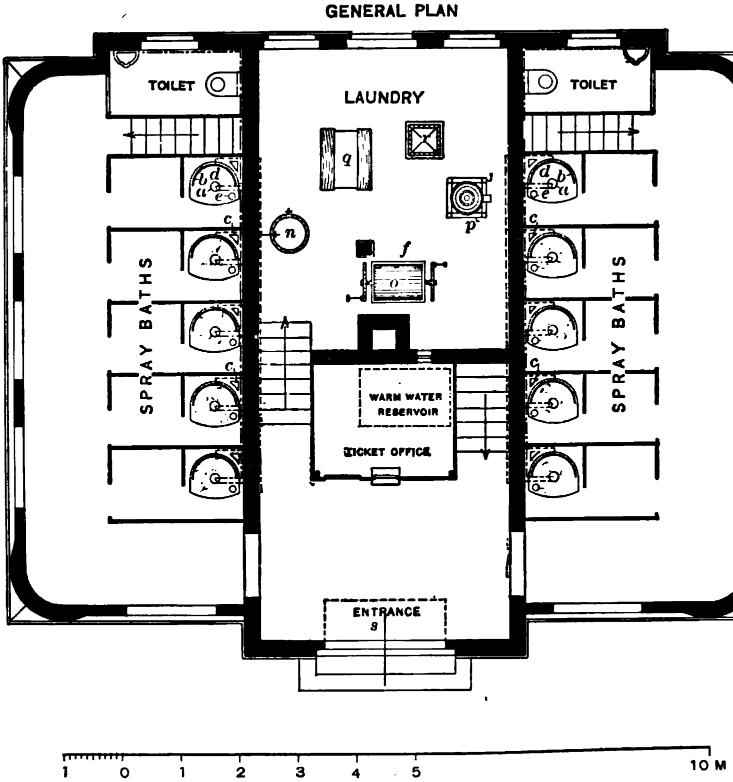

GENERAL PLAN
TOILET
TOILET
LAUNDRY
q
n
p
f
o
a
b
c
d
e
SPRAY BATHS
SPRAY BATHS
WARM WATER RESERVOIR
TICKET OFFICE
ENTRANCE
s
1 0 1 2 3 4 5 10 M

FIG. 43. PLAN OF A PEOPLE'S BATH HOUSE IN BERLIN, GERMANY.

bather can temper the warm water as desired, or finish up the bath with a colder spray, as he may prefer. Each spray is, in this case, operated by means of a lever cock with chain, and the latter can be fastened to a hook while bathing so as to leave the hands of the bather free. The floors of dressing room and bath are graded to the waste outlet provided for each compartment. The floors of corridors, waiting rooms and vestibules should be tiled.

Each Gegenstrom apparatus is furnished at the outlet for warm water with a manifold and shut-off valves, numbered to correspond with the number of each bath compartment. While the bather enters his dressing room, the bath attendant fills the measuring box for warm water in his bath compartment, and then turns off the apparatus, the fact that the measuring box is filled being announced by an electric alarm bell, or by a safety valve placed at the manifold.

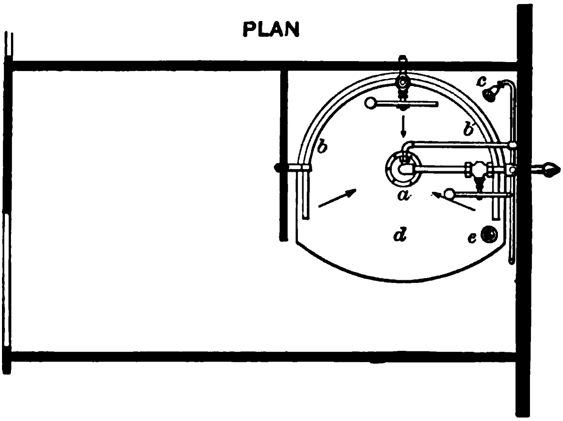


Fig. 44a. Plan of Bath Compartment in People's Bath House in Berlin, Germany.

Allowing thirty minutes for each bather, this bath house would have a capacity of $16 + 8 \times 2 = 48$ baths per hour, excluding the tub baths, or about 576 baths per day.

A large number of interesting examples of people's baths exist in Europe, particularly in Germany and in Austria. Fig. 43 illustrates the floor plan of one of the people's baths located in a suburb of Berlin. Figs. 44a and b show in plan and section the arrangement of the bath compartments in some of the more recent Berlin people's baths. In order to more thoroughly reach all parts of the body, the bath consists not only of overhead spray, but also of a plain kind of needle shower, and there is, besides, an ascending douche as shown at (c) in the illustration.

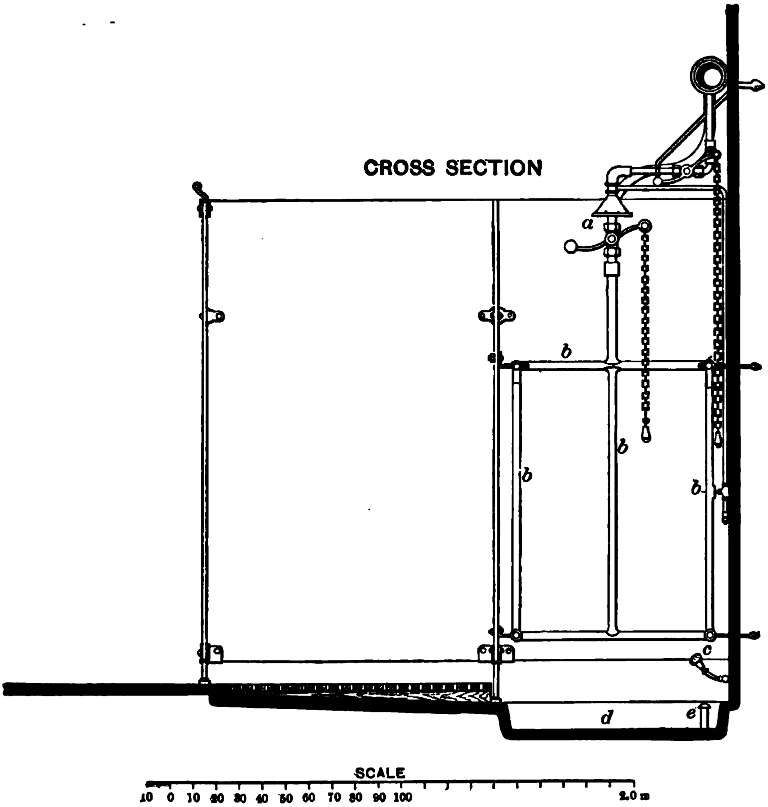


Fig. 44b. Section of Bath Compartment in People's Bath Houses in Berlin, Germany.

The people's bath houses of Vienna are described in an interesting paper by Herr Hermann Beraneck, engineer of the municipality of Vienna, in charge of all the bath houses. This paper appeared some years ago in the Journal of the Austrian Society of Engineers and Architects, from which I made the following translation:

THE MUNICIPAL PEOPLE'S BATHS OF VIENNA (*Translated*)

The municipality of the capital of Austria erected during the past twenty years a number of public or people's bath houses with spray or rain baths. These baths have been so well patronized, it may be reasonably assumed that they have had a favorable influence in improving the sanitary condition of the population, and in reducing the death rate of the city.

At the present time there are in the city of Vienna eleven people's baths, of which eight are located in the center of blocks, while three consist of buildings standing detached and surrounded by public gardens. The older bath houses consist each of two divisions, one for men and one for women. Experience with bath houses so arranged demonstrated the desirability of providing further subdivisions, for adults and for children, and seven of the bath houses now in use have each four subdivisions. In a bath house constructed in 1897 a fifth division was added, which is used as a reserve bath on days, or during hours, when the baths are unusually well frequented.

Each of the divisions consists essentially of a large dressing-room with lockers, wherein the bathers keep their wearing apparel, and of a bathroom, containing a number of bath compartments, each nearly square in plan and dimensions, and all of them open on the side toward the corridor. The compartments are divided by partitions, 6 feet 3 inches in height, and each contains a douche for warm or cold water.

In the following two of the Vienna public baths will be described and illustrated more in detail, namely, the oldest one, which was opened to the public on Dec. 22, 1887, and which is located in the Mondscheiugasse, and the latest bath, located in the Friedrich-Kaisergasse, and opened on March 6, 1897. The former has only two divisions with a total of 70 sprays and 110 lockers, while the latter has five divisions with 74 sprays and 234 lockers. The total number of sprays in the eleven bath houses is 698, so that about 20,940 bathers can be accommodated in them per day, or in other words in a year 7,643,100 baths can be given.

The problem of erecting a people's bath house is rendered difficult by reason of the fact that the closest economy is usually required in the cost of construction and equipment, while, on the other hand, it is very desirable in a building of this kind to have everything as durable, substantial and hygienically perfect as it is possible to make it. The interior equipment, and the furnishings in particular, should be of such a character that they may not be damaged, mutilated or spoiled by the bathers, many of whom are inclined to be careless or even mischievous. In the bathrooms everything must be durable, and of a finish which will withstand the influence of water, vapor and soap. Cleanliness and neatness must be maintained without an undue amount of labor. Finally the requirements of sanitation must be observed, and the transmission of contagious diseases must be efficiently guarded against.

The first point of importance wherein the Vienna people's baths differ from those of Berlin, Munich, Breslau, Hannover and other German cities relates to the arrangement of the bathrooms. While most German people's baths provide a number of separate smaller dressing-rooms, to each of which a spray bath is attached, all bath houses in Vienna have a general large dressing apartment, and the bathing stalls are located in another room, the bathroom proper. The number of lockers is three or four times as large as the number of sprays, because more time is occupied in undressing and dressing than in the bath. It is claimed that this arrangement is more advantageous, because it enables the giving of a greater number of baths. Experience in Vienna has also demonstrated the fact that it is more difficult to keep the separate dressing-rooms clean. On the other hand, it is admitted that the arrangement usual in German cities affords more privacy to the individual, but it is stated in Vienna the public had become accustomed to congregate bathing through the river and Russian baths, used so extensively before the introduction of the rain baths.

Fig. 45 illustrates the plan of the oldest Vienna public bath, which is located in the Mondschein-Gasse, in the center of a city district occupied largely by the laboring classes. This bath house, being at the time when it was built an experiment, was arranged in the basement of an old dwelling house, and was fitted up with the utmost simplicity. The divisions for men and women are located in separate wings, separated by a large court; each division contains a waiting-room, a dressing-room and a bathroom. The bathing compartments have corrugated iron partitions, and are provided with a curtain in front; the size of each bath stall is 2 feet 8 inches by 3 feet 3 inches. There are 42 compartments for men, and 28 for women. The corridors are 3 feet 3 inches wide. Each bather is given a bathing suit and one towel; a cake of soap is sold at cost price; the time allowed to each bather is twenty to thirty minutes, and each shower furnishes a limited amount of water.

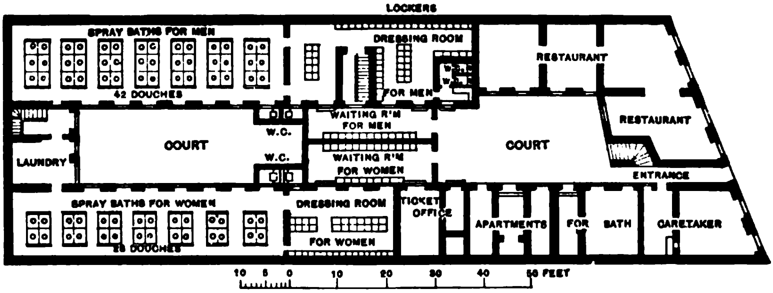

LOCKERS
SPRAY BATHS FOR MEN
42 DOUCHES
DRESSING ROOM
FOR MEN
W.C.
W.C.
RESTAURANT
RESTAURANT
LAUNDRY
COURT
W.C.
W.C.
WAITING R'M
FOR MEN
WAITING R'M
FOR WOMEN
COURT
ENTRANCE
SPRAY BATHS FOR WOMEN
28 DOUCHES
DRESSING ROOM
FOR WOMEN
TICKET
OFFICE
APARTMENTS
FOR BATH
CARETAKER
10 5 0 10 20 30 40 50 FEET

FIG. 45. PLAN OF PEOPLE'S BATH HOUSE IN VIENNA, AUSTRIA.

Figs. 46, 47 and 48 illustrate the cellar, ground-floor and first-floor plans of the latest public bath house, which has a frontage of about 50 feet and occupies an area of approximately 2,000 square feet.

The main entrance to the bath house, Fig. 47, is subdivided by a longitudinal partition on the entrance stairs, so that those who enter and those who leave the bath do not meet. At B is a general waiting-room, and the general ticket office

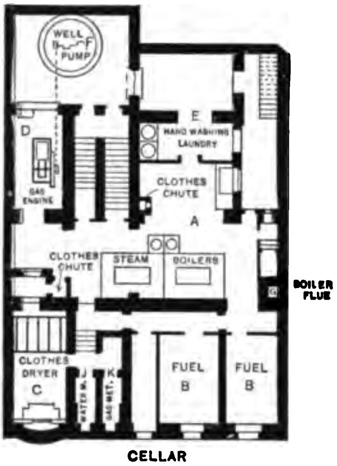

WELL
F
PUMP
D
GAS ENGINE
E
HAND WASHING LAUNDRY
CLOTHES CHUTE
A
CLOTHES CHUTE
STEAM
BOILERS
BOILER FLUE
CLOTHES DRYER
C
J
K
WATER M.
GAS MET.
FUEL
B
FUEL
B
CELLAR

FIG. 46. CELLAR PLAN OF ANOTHER PEOPLE'S BATH HOUSE, IN VIENNA, AUSTRIA.

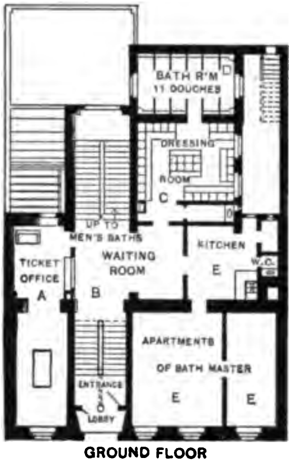

BATH R'M
11 DOUCHES
D
DRESSING
ROOM
C
UP TO MEN'S BATHS
WAITING ROOM
B
KITCHEN
E
W.C.
TICKET OFFICE
A
APARTMENTS OF BATH MASTER
E
E
ENTRANCE
LOBBY
GROUND FLOOR

FIG. 47. GROUND FLOOR PLAN OF ANOTHER PEOPLE'S BATH HOUSE, IN VIENNA, AUSTRIA.

(for men and women) is arranged at A. The bathing master and his family live in the apartments E.E.E., consisting of living-room, bedroom and kitchen. In the rear of the basement floor is located the above referred to fifth or emergency division of the bath house, consisting of dressing-room C and bathroom D, with eleven showers. The main staircase leads to the division for men and for boys, which is located on the first floor (Fig. 48); the stairs continue up to the second floor (not illustrated), which contains the divisions for women and for girls, and which is identical in arrangement with the first floor. On days when the bath house is much frequented, the entire first floor is used for men, and the fifth division in the basement is used for boys.

The first floor (Fig. 48) is arranged as follows:

From the main staircase the bather enters the general waiting-room A, and the men go to the large dressing-room D, which is about 33 feet long, and about 17 feet 6 inches wide, and contains 66 lockers; adjoining the dressing-room is a large bathroom E, about 24 feet by 21 feet, with 21 compartments and sprays. The boys' dressing-room is located at B, and is 32

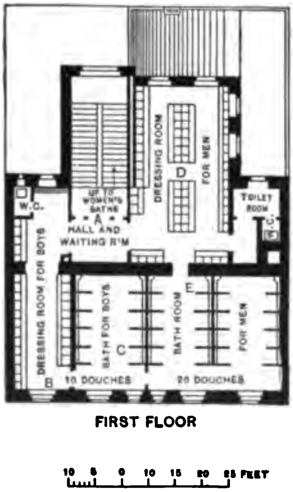

DRESSING ROOM
D
FOR MEN
W.C.
UP TO WOMEN'S BATHS
A
HALL AND WAITING R'M
TOILET ROOM
DRESSING ROOM FOR BOYS
BATH FOR BOYS
C
BATH ROOM
E
FOR MEN
B
10 DOUCHES
20 DOUCHES
FIRST FLOOR
10 5 0 10 15 20 25 FEET

FIG. 48. FIRST FLOOR PLAN OF ANOTHER PEOPLE'S BATH HOUSE, IN VIENNA, AUSTRIA.

feet by 10 feet, and contains 28 lockers; adjoining the same is the boys' bath C, with 10 compartments and sprays. The men's bathroom E and the boys' bath C are ordinarily divided by a partition of Monier construction, and they can be thrown into one by opening a door provided in this partition.

Each story is about 13 feet in height. The attic story contains two iron warm-water tanks, each of 2,250 gallons capacity, and one cold-water reservoir of 375 gallons; plenty of space is available in the attic for the drying of the wash on rainy days. Ordinarily the wash is hung up in the yard, but on days when the baths are much frequented a clothes-drying apparatus, fitted up in the cellar at C (Fig. 46), and heated with warm air from a furnace, is used. The cellar contains two large steam boilers at A, connected with the boiler flue G, also a laundry E, for hand washing, bins for fuel at B.B., vaults for gas and water meters at J and K, and the clothes chutes H and L. A gas engine, fitted up in room D, serves for the pumping of water from a well at F. Well water is used whenever the general city supply (from springs in the Alps) is running short. The well is 10 feet in diameter at the top, is built up in masonry to a depth of about 163 feet, and from this point downwards it is drilled 40 feet more in depth.

The following details of construction are of interest:

The ceilings are constructed according to the Monier system with arches two inches thick, located between I-beams, spaced about 13 feet apart. The surface of the arches was rendered water-tight by asphalting. The floors are filled with concrete, about 3 inches thick. On this is placed the floor proper, which consists of artificial cement pavement, about ¾ inch thick, roughened on the surface to prevent its becoming slippery from soapy water.

The shower compartments are about 3 feet square, the partitions are 2½ inches thick, constructed according to the Monier system, and run down to the floor, where all corners are rounded to facilitate cleaning. The cement and iron wire partitions have proven durable and have not required any repairs. Some of the older Vienna bath houses have partitions of corrugated iron, which have to be painted over regularly twice a year, and are therefore expensive in maintenance. Partitions of pitch pine wood did not prove durable and looked clean only while new. A trial has also been made with a partition of cast glass, about ½ inch thick, 31½ inches wide, and about 6 feet 2 inches high, resting in the wall and supported in front by an iron leg; the same has proved in every way sanitary, cleanly, durable and reasonable in cost. Common glass of a brown-reddish color was used, which is stated not to be transparent.

Each compartment contains a semicircular porcelain perforated soap dish and an overhead shower. The showers are not arranged inclined, as in the German bath houses, but stand vertical at a height of about 7 feet. The showers are made of gun metal, and are four inches in diameter. The flow of water from the shower is adjusted by means of diaphragms or washers. The shower is operated by means of the bent lever with chain and treadle action; as soon as the pressure on this is released, the valve closes with the water pressure and the flow ceases.

Formerly the showers were operated by hand pull, but the new arrangement is considered preferable as it leaves the hands and arms of the bather free. It is also found that the arrangement causes less water to be wasted; in the showers operated by hand pull the average consumption was 25 gallons, and this has been reduced about 25 per cent.

The first Vienna bath house, illustrated in Fig. 45, was fitted up with inclined showers, operated by a rod, which the bather had to push up and down to open and close the valve controlling the shower. A large waste of water was caused by carelessness or forgetfulness of the bathers (as much as 100 gallons being sometimes used for a bath). Later on counterweights were attached to the rods, but these proved to be very noisy in action, and many of the levers broke and caused some accidents to bathers. Since 1890 the new form of shower, with stuffing box, has been exclusively used and has proved very successful in use. The engineer in charge of the bath houses claims that there is practically no advantage in setting the showers inclined (?).

The floor of the bath compartment is not arranged with molded, countersunk basin, answering the purposes of a foot bath, as is commonly found in the German public baths. To secure good drainage the floor is merely pitched to an open gutter at the rear of the bathing compartments, and the gutters in turn have trapped connections with the house sewers.

The heating of the bath houses is accomplished by either low-pressure hot water or steam. The bathrooms and the congregate dressing-rooms are kept at a temperature of not less than 68 degrees Fahr. The temperature of the douche water is kept at 95–98 degrees Fahr. in winter, and at 90–95 degrees Fahr. in summer, the water being warmed by steam. Owing to the loss of heat by radiation the water in the warm-water tanks in the attic is kept a few degrees higher, and this temperature is registered at the ticket office of the bathing master by means of electric maximum thermometers with alarm bell. The water in the cold-water tank is also tempered (being at 47 degrees Fahr. as it comes from the street main) to from 53–61 degrees Fahr.

The ventilation of the principal rooms is so arranged as to effect a renewal of the entire air in the winter once every hour. The radiators stand under the window sills, and openings for the direct admission of fresh air at the base of the radiators are provided. The foul air is removed by registers set in vent flues, both at the ceiling and near the floor.

The dimensions of the lockers in the dressing-rooms are 14½ inches in width, 16½ inches in depth, and 5 feet in height. Inside of each locker are provided a shelf and three hooks; the bottom forms a depository for shoes. Each locker is provided with door and patent lock, and the door and key carry the same number, while no two keys are alike. The dressing-rooms are fitted up with a large mirror, with comb and brush hung on chains, and there are also bootjacks, shoe buttoners, a clock, etc. Water-closets are provided on each floor of the bath house. Drinking water can be obtained from faucets, fitted up with tinned steel cups, hung on chains. All apartments are well lighted by double windows with opaque glass panes.

Some data regarding the management and financial results of the Vienna people's baths may be of interest. The hours for bathing are the same for all the divisions, *i.e.*, for men, women, boys and girls; except that in winter time the hours are shorter than in summer. On week days (except Saturday) the bath houses are open from 7 to 9 A.M. and from 2 to 8 P.M., and on Sundays from 6 or 7 A.M. to 12 o'clock noon; on Saturdays the bath is open from 7 to 12 A.M. These hours have been regulated in conformity with the usual modes of living of the people of Vienna.

On entering the bath house each person receives, upon payment of five kreuzer (two cents), a stamped and dated ticket on which a number is printed. He presents the same to the bathing master, and receives a key for a locker, one clean dry towel, and a bathing dress, consisting in the women's department of a long apron to be hung from shoulder straps, and of a short loin cloth for the men.

The duration of the bath is fixed at thirty minutes, not including the time for undressing and dressing. The employees are forbidden to receive any fees.

Each bath house is in charge of a bathing master, who must have practical experience as a machinist, and who must also be proficient in rendering first aid to the injured. He attends to the ticket office, controls the management of the heating apparatus, of the laundry and of the baths, and directs the bath assistants. He is held responsible for the maintenance of order and cleanliness in the bath house, for the entire furniture and the bath towels and suits. He has lodgings in the building, receives a monthly salary, and is permitted to sell soap cakes at 1 kreuzer (⅖ cent or 4 mills) per cake, and also receives an annual premium on the saving in expense for the fuel.

Ordinarily two male and one female attendants are sufficient, but during the summer there are often six to eight attendants.

During the ten years from 1888–1897 these people's baths have grown steadily in popularity. In the year 1896 three, and in 1897 four of the buildings have had a total number of visitors exceeding 100,000. In 1897 more than one million baths were given in the eleven bath houses. The following table shows the steady growth in the number of people who went to the baths.

(The figures in the table denote *thousands*.)

NUMBER OF VISITORS IN THE YEARS

BATH HOUSE	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897
I	.....	.....	.....	.....	6	37	54	59	62	71
II	.....	.....	.....	17	55	64	72	82	89	93
III	.....	.....	.....	.....	....	25	46	58	64	80
IV	.....	.....	26	79	92	87	99	99	102	114
V	.....	.....	.....	.....	9	60	77	86	94	106
VI	78	96	96	92	94	91	84	84	83	83
VII	.....	.....	.....	.....	11	60	82	96	100	111
VIII	.....	.....	.....	.....	7	36	56	63	64	80
IX	.....	.....	23	62	69	75	89	97	107	120
X	.....	.....	.....	.. ..	.....	.....	3	64	75	86
XI	.....	.....	.....	.....	.....	.....	.....	.....	.....	69
Total	78	96	144	249	342	526	663	788	841	1,014

From the table it appears that one bath house (VI) did not show the steady growth in attendance of all the others. This was the oldest bath, illustrated in Fig. 45, and it is stated that the cause of it was the old-fashioned plan and inferior arrangement of the bath.

The percentage between male and female visitors varies largely according to the seasons. In 1897, 19.7 per cent of all bathers were women. The greatest average percentage of women was 23.3, the least 15.6. In June, which was the hottest month of 1897, 25.3 per cent were women, in January only 13 per cent, and in December only 11.5 per cent.

The largest number of persons on a single day in one of the bath houses was 3,332 (June 5, 1897); the least number of persons was 27. The greatest frequency during a day occurs during the evening hours.

In Vienna the people's bath houses are not used by the poor population only; one bath house, for instance, which is located in the neighborhood of the Medical School of the Imperial University, is much frequented by medical students.

The cost of a single bath averages about 5.5 kreuzer (2 cents), or more than the price of admission charged. This, however, was expected, and the deficiency is cheerfully borne by the municipality, inasmuch as the people's baths are intended to be a salutary public measure.

The cost of erection of a bath house averaged about $25,500, or $350 dollars for each bath compartment.

CHAPTER IX

FACTORY AND WORKINGMEN'S BATHS

EVERY large manufacturer who is interested in the welfare of his employees should consider the question of providing at the factory free baths for workmen. Many working people, living in tenements, have at present no facilities at home for keeping the body clean. Factory employees are particularly exposed to soiling and defilement of the skin through the nature of their occupations. They usually perspire very freely while at work, and the increased action of the skin, combined with the dirt and dust of their surroundings, makes it particularly desirable that they should take a bath frequently to become clean, to keep in good health, and so as to be in the best possible condition for the hard manual labor performed by them in the factory. It would seem to me that manufacturers would secure higher results in the work performed by their operatives if they provide plain and inexpensive facilities for frequent bodily ablutions.

Neither bathtubs nor swimming tanks are well adapted to the needs of the workingmen in factories. A dusty or dirty laborer, a factory operative manipulating or handling animal or vegetable matters, paints, dyestuffs or chemicals, and the engineer and the firemen who spend the day in the hot engine or boiler room, stoking the fires, shoveling coal and oiling the engine and other machinery, would soon, were they to take a bath in a tub, sit immersed in a dirty fluid, and cleanliness would under such circumstances be difficult to attain. For factories and industrial establishments the tepid spray of the rain bath offers immense advantages. These are so plain and apparent that it seems unnecessary to waste any words about them, except to point out that, inasmuch as waste or exhaust steam is always available in such establishments, the heating of the water for bath purposes can be cheaply and quickly effected. The expense of providing and maintaining plain tepid rain baths for workmen in factories cannot therefore be very considerable, and among the movements for industrial betterment of the workmen the establishment of workingmen's baths is calculated to be one of the greatest blessings.

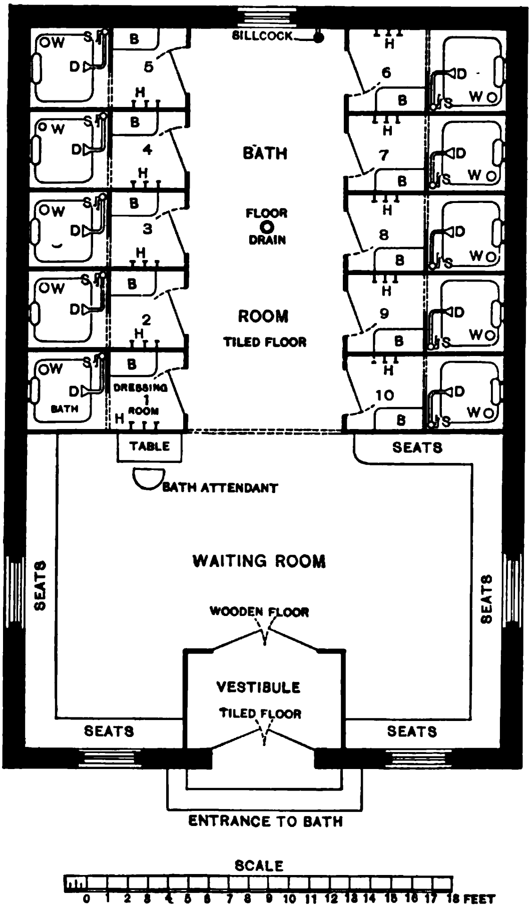

SILLCOCK
BATH
FLOOR
DRAIN
ROOM
TILED FLOOR
W
D
S
B
H
1
2
3
4
5
6
7
8
9
10
BATH
DRESSING
ROOM
TABLE
SEATS
BATH ATTENDANT
WAITING ROOM
WOODEN FLOOR
SEATS
SEATS
VESTIBULE
TILED FLOOR
SEATS
SEATS
ENTRANCE TO BATH
SCALE
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 FEET

Fig. 49. Plan for a Proposed Factory Bath House.

In Fig. 49 I show the plan for a small bath house, adapted to the requirements and needs of manufacturing and industrial establishments. It contains a general waiting room and a bathroom with ten bath units. The capacity of such a bath house would be from twenty to thirty baths per hour.

Some years ago a conference was held in Berlin, Germany, regarding means and ways for the improvement of the condition of the laboring men. At this conference a paper was read by Herr Baurat Herzberg, in which he discussed the arrangement and fitting up of "Workingmen's Baths in Industrial and Manufacturing Establishments."

Although this paper had chiefly reference to the conditions prevailing in Germany, it contained a great deal of valuable information regarding the details of the planning and fitting up of such baths. The following abstract from the paper * will, no doubt, prove of interest to those concerned with the welfare of the laboring classes, and also in particular to architects, engineers and builders, who have sometimes to do with the planning and arrangement of such baths.

To begin with, Herr Herzberg, who is a constructing and sanitary engineer of great ability, and whose firm has carried out many plans for the installment of public baths, and of baths in military barracks and working establishments, points out the difference, from a constructive point of view, which exists between people's baths, baths for workingmen and such for military barracks.

"All people's bath houses must be kept running the whole day, and the visitors distribute themselves over the entire time during which the bath is kept open. But even in people's baths there is at times, and during special hours, a much larger frequency, particularly so just before holidays and generally on Saturdays. The dimensions of the baths, the means for heating the water and the size of the main water supply-pipe are governed thereby.

"In baths for military barracks, armories, etc., everything is regulated strictly according to military rule and discipline, and bathing is done in squads who are usually commanded to undress, to walk under the shower, and again to dress.

"Of course, anything like such a system would be out of the

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* Translated by W. P. G.

question in a bath for workingmen. Some sanitarians have laid down the requirement that baths in factories and manufacturing establishments should be ready at all times of the day, but this is obviously out of the question, because the expense of maintenance would be too large, and if such requirements were insisted upon, the owners of many industrial establishments would necessarily be deterred from installing baths for their workingmen. While it would be a mistake to limit the bathing time to a few hours after the closing of the workshops, it is, on the other hand, necessary to regulate the baths according to a limited time schedule."

Regarding river baths for bathing in summer time, Herr Herzberg mentions the fact that many factories, located along the shore of a river or lake, could with advantage arrange such baths for their workingmen and that the same could be erected very cheaply.

Regarding artificially constructed swimming tanks for workingmen, the author holds the opinion that these, too, should not be entirely discountenanced. "The almost universally entertained objection against swimming baths arises from the well-known fact that many of them are not properly kept clean. If they were so planned and arranged as to provide for a sufficient change of water in the tank, even sanitarians could not well object to them. It is, nevertheless, true that many of the modern swimming baths in public bath houses are objectionable, because upon close inspection it will be found that the water which flows in a cascade into the basin, and thereby gives the impression as if it were clean, fresh water, is in reality simply the water which has been removed from the tank by either suction pumps or by a circulation pipe, and which is returned to the bath again and again.

"When all sanitary requirements are fulfilled, swimming baths are certainly unobjectionable. It is important that the entire basin should be emptied once every twenty-four hours and then cleaned, and that there should be a fresh supply of water amounting to 528.4 gallons (2 cubic meters) daily for each bather.

Details of Workingmen's Swimming Baths — "Take, for example, a swimming tank of 42 feet 8 inches by 29 feet 6 inches in area; this would contain about 52,840 gallons of water, and if the water is renewed once in twenty-four hours, 100 persons could bathe in it. The cost for pumping the water for the tank would amount to from about one-fourth to one cent per 264.2 gallons, and sometimes even less. Such a swimming bath would, therefore, require an expenditure of from one-half to two dollars each day for the water supply. The required heating of the water would cost much more than this. Assuming that the water is pumped from a well and that its temperature is about 53.6° Fahr. and that it must be warmed to 72°, this would require for the warming of 52,840 gallons daily about two million heat units. To generate these about 1,323 pounds of coal will have to be burned, though a slight reduction in the amount would take place where exhaust steam is available. The above swimming tank would, therefore, require an expenditure of from one and one-half to three dollars for heating the water. It would provide baths for 600 workingmen for a week, at two to five cents per person per week, which would mean that the cost for the bath of each person would amount to one-third to five-sixths cent per day. The surface of the water tank would comprise 1,259 square feet, and if we add to this the necessary space for dressing-rooms, this makes a total floor space of approximately 2,153 square feet, which is more than spray baths of the same capacity would require. Only one-half of this space would be required if a number of bathtubs were installed to give the same number of baths."

The author recommends that the sides of the tank should not be finished with cement, because this becomes rough at times, does not adhere to the walls, and is hard to clean. "The best finish," he says, "consists in glazed tiling or else plates of hammered glass with a light background."

"The size of the waste and supply pipes must be made very ample in order to fill and empty the swimming bath quickly. It should be remembered that with a fall of 1 in 100 a waste pipe, 12 inches in diameter, is required to accomplish the emptying quickly. The diameter of the supply pipe depends upon the available water pressure."

"On the whole, the running expenses for the maintenance of a swimming bath are considerable, and in connection herewith it must not be overlooked that the swimming baths always require, in addition, some form of preliminary cleansing bath, either a douche or a tub bath, both of which increase the cost correspondingly.

Workingmen's Tub Baths — "A few tub baths are always desirable in connection with spray baths, particularly in manufacturing establishments, for the female employees. The usual allowance of space is four square meters (43 square feet) for each bathtub compartment, not including the space required for the corridors. Tub baths do not render as effective a service as spray baths, particularly when the proportion of space occupied by them is considered, for not more than two baths can be given per hour with one tub."

The author points out a few minor matters pertaining to constructional details, which appear to him of importance.

"First, the tub should never be fastened permanently, either with the wall or with the floor, and consequently neither with the supply nor with the waste pipe, because it is a matter of common experience that a great deal of dirt accumulates behind the tub. This dirt is hard to remove and is the usual cause for the moldy or musty odors attaching to bathrooms. The bathtubs must be so placed that the outlet comes directly over the waste in the floor, and the latter is best arranged so as to provide for the removal of the water from the floor in the room. With a proper size and inclination of the waste pipe, no overflow need be feared when the waste valve or plug of the bathtub is opened to discharge the same."

"The supply to the tubs should always take place over the top or near the same. The objection made that this creates too much vapor of steam is only valid when the hot water is heated too near the boiling point, which the author does not consider good practice. He favors, on the contrary, that the bath water should be heated only to the exact temperature at which it is required in the tubs, and in this case no steam vapor would form, as happens when warm water of 158° to 176° Fahr. is discharged into cold water.

Showers or Sprays in Connection with Tubs — "As a rule, there should be a shower-head fitted up over each tub; it is a great convenience and costs but little. It must, however, be arranged so that it will give water at any desired temperature."

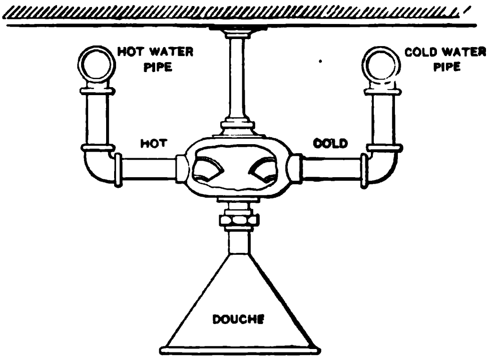

FIG. 50. DETAIL OF MIXING DOUCHE FOR WORKINGMEN'S BATHS.

The author is not in favor of the ordinary arrangements of mixing valves for hot and cold water, because they are usually quite complicated, require frequent repairs, and because they do not mix the water properly, largely because the water pressure in the hot and cold water pipes varies with the changeable draft on these pipes. Showers supplied from mixing valves often give a warm and cold spray alternately, according to the number of other faucets open on the line.

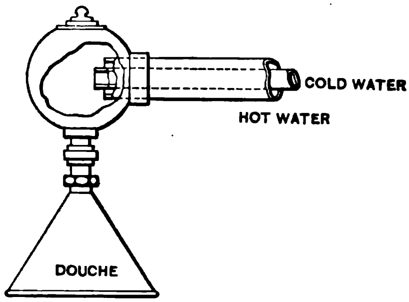

FIG. 51. DETAIL OF MIXING DOUCHE FOR WORKINGMEN'S BATHS.

The author suggests that a much surer way to mix water of different temperatures is to bring them together at a point where the water has lost its head of pressure, in other words, in the shower itself. This can be easily accomplished, either according to Fig. 50 by means of separate cold and warm water pipes carried parallel to each other into the head of the shower, or else according to Fig. 51, by carrying the cold-water pipe inside of the hot-water pipe. In this case two simple compression valves or stops are arranged on the hot and cold supply, and by opening these valves any desired temperature of the spray water may be attained with absolute accuracy.

Warming the Water for Tub and Spray Baths — The author lays particular stress upon the desirability of keeping the temperature of the water in hot-water tanks not higher than 96° to 100° Fahr., and obtaining the desired temperature of the bath water in tubs and showers by adding a small amount of cold water. One advantage, he says, is that this does away with the danger of scalding. It is an error to assume, as is often the case, that this principle, advocated by the author and used by him in all the tub and spray baths installed by him, requires more fuel for warming the water.

In order to regulate and control the temperature of the water in the hot-water tank the author provides a simple arrangement, as illustrated in Fig. 52, consisting of a draw-off cock A, a hot-water thermometer B, and a short pipe connecting them with the tank. By leaving the water run for a short while the temperature of the tank water will be indicated nearly correctly at the thermometer. It is, of course, necessary to provide a much larger hot-water tank where the water is only moderately warmed. On the other hand, the size of the cold-water tank becomes much less, assuming that cold water is also supplied under tank pressure. Other advantages incident to the arrangement are that the hot-water pipe lines do not

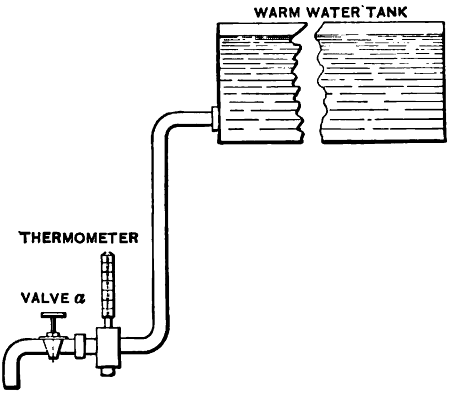

FIG. 52. SKETCH SHOWING METHOD OF DETERMINING TEMPERATURE OF THE HOT WATER.

become very hot, that there is no radiation of heat from them, that there is less expansion of the pipes, a greater durability of the piping, faucets and valves, a simplification in the management, and an exclusion of all danger from scalding.

Bath Compartments for Workingmen — "The capacity of the bath house depends greatly upon the size of the supply and waste pipes to the tubs. If, for example, there are fifty tubs, and it is desired to fill and empty ten of these simultaneously in three minutes, the size of waste pipe should be from 4 to 7 inches. Mistakes are often made with regard to this point, resulting in a reduction of the capacity of the establishment.

"The partitions should be raised from the floor about 6 inches, as this increases the circulation of air, and facilitates cleanliness, because the whole floor can be easily flushed and scrubbed. The partition should rest on brass legs, for iron legs cause rust stains. Slate, or else a cheap quality of marble, is well adapted for a material for partitions. Brick partitions, about 2¾ inches thick and finished in cement, are also suitable. Galvanized corrugated iron rusts in time and is not to be recommended. It is also difficult to fasten the pipes and valves to corrugated iron partitions, and each screw or bolt hole will in time cause the rusting of the iron.

Floors — "The floor should be of a material which is a good non-conductor of heat, so that the bather's feet may not be chilled. Durability is a chief requirement. Wooden lattice floors are not desirable, as they gather and retain dirt. Lattice floors of hard rubber have been tried by the author, but found to be too expensive.

"An asphalt floor is, on the whole, the best; it is warm to the feet, and when carefully laid does not crack. The floor of the bath compartment should be somewhat lower than the floor level of the corridor, so that this may not become wet. (Fig. 53.)"

Wooden footstools are convenient for placing the feet upon in dressing and undressing.

Tubs for Workmen — "As regards the best materials for tubs in bath houses, it should be said that tubs of wood should be permitted only for mineral water and certain medical baths. Tubs of porcelain and of glass are expensive, absorb a great deal of heat from the warm water, and are easily damaged. Tinned solid copper tubs are quite expensive. Masonry tubs, finished with cement, are liable to have cracks, and require, like the glazed fire-clay tubs, a great deal of hot water.

"In the Berlin Asylum for Homeless the author made use of tubs constructed of 'terrazzo,' which have lasted well with two years' continuous use, largely because the hot-water supply is arranged in accordance with the above outlined principle, *i.e.*, of furnishing moderately warm instead of hot water. These tubs would not last well with hot water. A well-enameled iron tub is readily cleaned, and although it costs twice as much as a zinc tub, its durability is at least twice as great. Should the enamel chip, the defect may be covered up by white enamel paint.

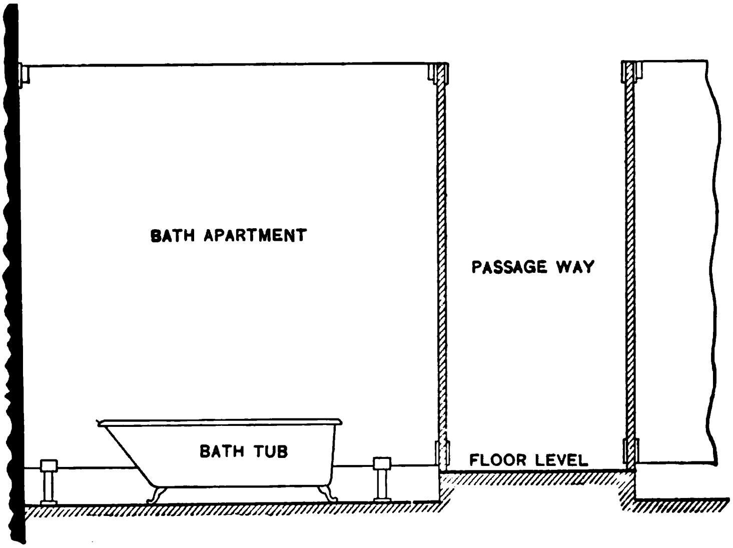

FIG. 53. SECTION SHOWING ARRANGEMENT OF FLOOR LEVELS FOR WORKINGMEN'S BATH HOUSE.

Spray Baths for Workmen — "The spray bath is the form of bath particularly adapted to manufacturing establishments:

first, because its efficiency in proportion to the first cost and the running expenses of the bath is greater; and, second, because a shower or spray, with jets which are not too fine and prickly, has a good effect upon the action of the skin. The rain bath was used first by Dr. Muennich, Chief Surgeon in the Prussian Army, and Prof. Oscar Lassar has done much to awaken interest in this form of bath.

"At first the showers delivered the water vertically downward over the head, neck and shoulders; subsequently they were placed inclined to prevent the water from striking the head, and to direct it more against the chest and the back. A 'rain' bath may be taken in one and one-half minutes, with only from eight to thirteen gallons of water, which indicates the immense saving in time and in cost.

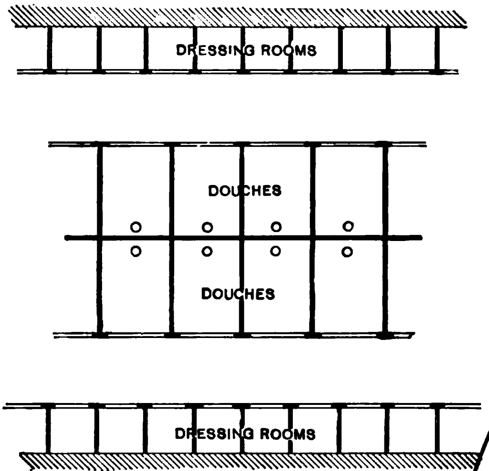

FIG. 54. PLAN SHOWING DETACHED ARRANGEMENT OF SHOWER COMPARTMENTS AND DRESSING ROOMS FOR WORKINGMEN'S BATHS.

Arrangements and Plans of Spray Baths — "In soldiers' baths and also in school baths the plan is usually very simple, as dividing partitions may be entirely omitted. Such arrangement, however, does not seem suitable for factory baths, as it lacks privacy. In Figs. 54 and 55 are shown two types of plans, in both of which the bath compartments and the dressing rooms are separated from each other. In this case it is advisable to provide about three or four times as many dressing-rooms as there are bath compartments, because the dressing and undressing require three to four times the time needed for bathing.

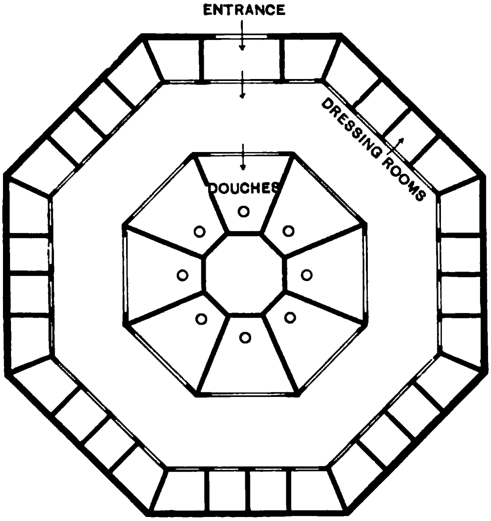

Fig. 55. Plan Showing Detached Arrangement of Shower Compartments and Dressing Rooms in an Octagonal Bath Pavilion for Workingmen.

"Fig. 56 shows a type of plan wherein each bath compartment has its separate dressing-room, the two being located together. This form of plan, however, reduces the capacity of the bath house to one-third as compared with the type shown in Figs. 54 and 55. Therefore it is not likely that it will be adopted in industrial establishments which have a large number of operatives; moreover the general superintendence is more difficult.

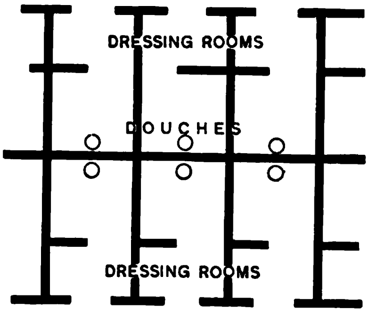

Fig. 56. Plan Showing Arrangement of Workingmen's Baths, where Dressing Room and Shower Compartments are Combined.

"It is not to be recommended to combine two or more dressing-rooms with one bath compartment, as this might lead to disturbances and would increase the difficulty of management. In mining districts the dressing-rooms may also be utilized as lockers for the workingmen's suits. In baths for coal miners single bath compartments are not advisable, as it becomes necessary, owing to the coal dust, that the bathers assist each other in cleaning their backs.

Water Supply for Spray Baths — " In the case of spray baths it was feared at first that if water was available in unlimited quantity for each bather this would lead to a large consumption and waste of water, and appliances were accordingly devised which limited the amount of warm water for each bather. Such arrangements have now been abandoned, for experience has taught that no unusual waste of water occurred. The increase amounted to only a few gallons, viz., from 8 or 9¼ to 10½ or 13¼.

"It is desirable to introduce cold water to the shower, in order to afford the bather an opportunity to finish up the bath with a cold spray. This, as is well known, protects the bather from catching cold.

"It is likewise important that the feet of the bather should stand in tepid water while the shower is running. This affords an excellent opportunity for washing the feet. It is usual to provide a small seat, fastened against the wall.

Details of the Shower-Head — " It is very important that the showers and their controlling valves should be constructed simple and durable, as they otherwise wear out quickly from much use.

"Years of observation and experience have taught the author that the 'rain' bath is very refreshing and acts as a tonic, but that in one respect it is inferior to the tub bath in point of cleansing the body. With a vertical or inclined overhead spray the lower parts of the body do not receive sufficient water.

"For some time the author has therefore arranged the 'rain' bath with an ascending spray or jet (a), Fig. 57, the valve H of which is controlled by the bather. Instead of a spray, a simple bent pipe with a number of holes answers the purpose equally well, as shown on the right-hand side in the same illustration. This arrangement facilitates the washing of the lower part of the body.

Size of the Jets of the Spray — " With regard to the size and strength of the water jets of sprays, the author calls attention to the well-known fact that many bathers cannot endure the water falling from a shower with very fine and sharp jets. The spray baths are called 'rain' baths just because the water is supposed to fall on the body 'like a gentle rain shower.' Some have attempted to accomplish this object by setting the spray at a height not exceeding 7 feet 6 inches from the floor. But even then the jets may become too powerful if the reservoir from which the spray is supplied is placed very high above the douche. The holes in the face of the spray should be about 0.07874 or $\frac{5}{64}$ inch in diameter. Smaller holes cause the jets to be too sharp."

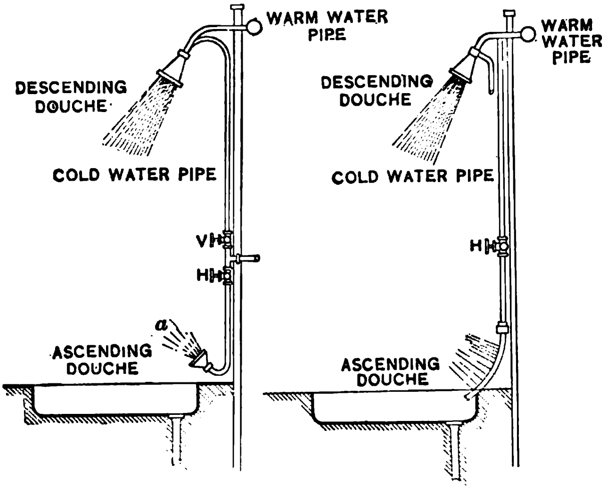
WARM WATER PIPE
DESCENDING DOUCHE
COLD WATER PIPE
V
H
a
ASCENDING DOUCHE
WARM WATER PIPE
DESCENDING DOUCHE
COLD WATER PIPE
H
ASCENDING DOUCHE

Fig. 57. Details of Spray Baths, Showing Descending and Ascending Sprays.

* * * * * * *

The photographic illustrations (Figs. 58–66) in this chapter show views of a few spray baths installed in modern large American manufacturing plants. The tendency of thus providing for the maintenance of health and cleanliness of the operatives seems to be spreading rapidly, and I have selected only a few out of many examples.

From a pamphlet on "The Social Economics of the Weston Electrical Instrument Company of Newark," prepared for the Louisiana Purchase Exposition at the request of the Bureau of Statistics of Labor and Industries of the State of New Jersey, I take the following description and illustrations of the swimming pool, the shower baths and the lavatories provided for the employees of the firm:

"Connecting with the dressing-room is the lavatory, a room 40 feet by 75 feet with a ceiling 16 feet high (see Fig. 58), lighted and ventilated by many windows, and with an individual porcelain wash basin, individual soap, and individual locker for each man. The plumbing and all appurtenances of this department are of the highest quality and best style, the prevailing idea being to create perfect sanitary conditions. The toilets are in every respect of equal grade with the lavatories. Drinking water of excellent quality and temperature is supplied by the company's artesian well, and is distributed throughout the works by automatic jet fountains, thus doing away with cups or glasses.

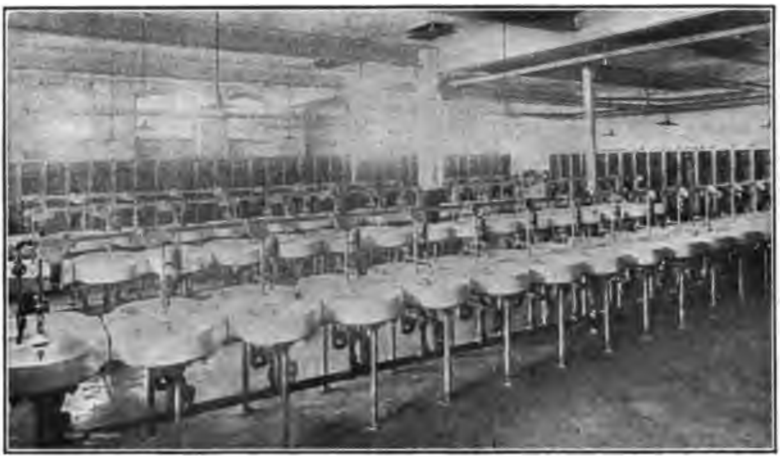

FIG. 58. VIEW OF WORKMEN'S LAVATORIES IN WESTERN ELECTRIC MACHINE WORKS, NEWARK, N. J.

"Directly under the dining hall is the natatorium, a hall 160 feet by 35 feet, with a 20-foot ceiling, light, bright and cheerful. This bath is a splendid affair. The tank is cemented and lined with enameled brick, is 150 feet long, 18 feet wide and from 4½ to 9 feet deep. (See Fig. 59.) The flooring is a handsome white mosaic

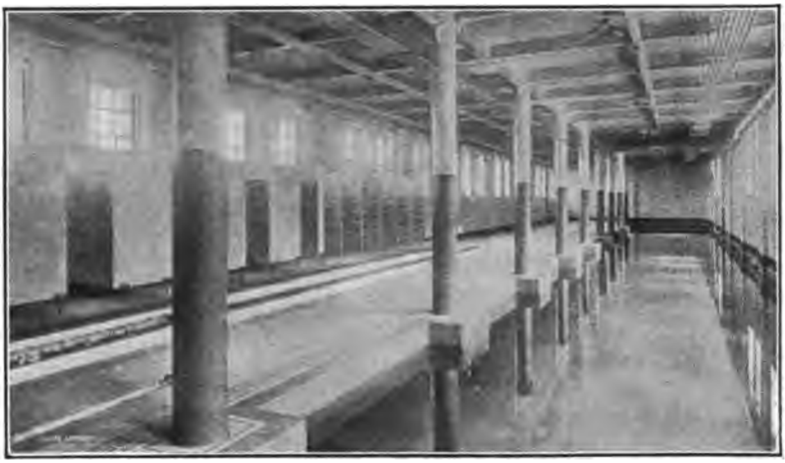

Fig. 59. View of Plunge Bath for Employees in Western Electric Machine Works, Newark, N.J.

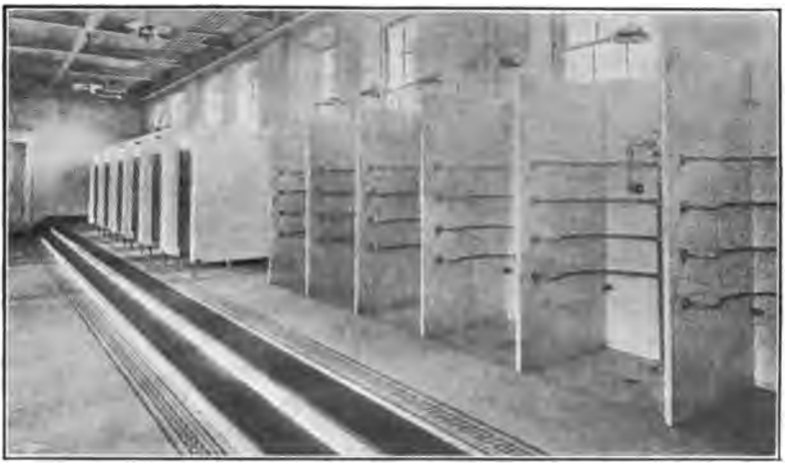

Fig. 60. View of Shower Baths for Employees in Western Electric Machine Works, Newark, N.J.

tiling tastefully bordered in colors. At one side the floor is raised by marble steps, and here are located the shower baths. (See Fig. 60.) There are batteries of shower and needle and also tub baths, six of each. The entire water for the baths is filtered. Here, as in the lavatories, the plumbing is fine in quality and pleasing in style.

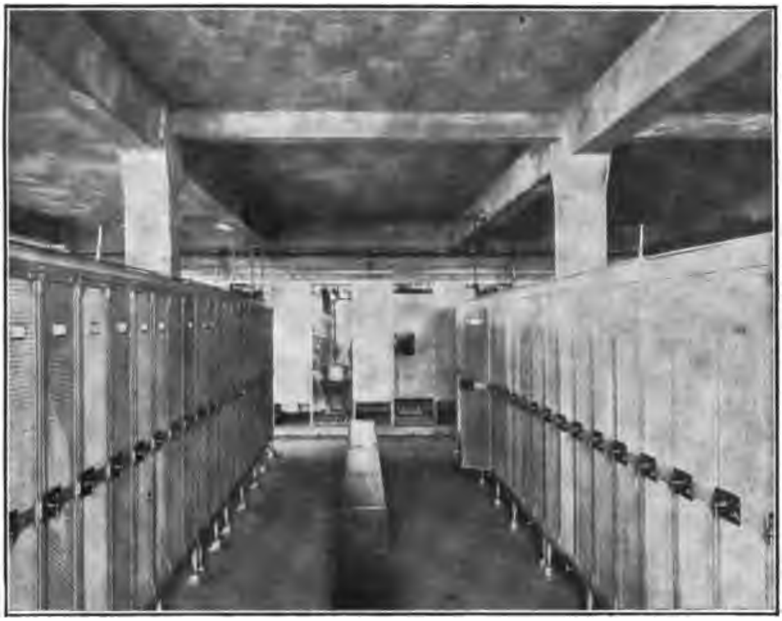

FIG. 61. VIEW OF WORKINGMEN'S BATHS IN WORKS OF BROWN AND SHARPE MFG. CO., PROVIDENCE, R.I.

All bathers are required to take the showers before going into the plunge."

The illustrations, Figs. 61 and 62, kindly furnished me by the Brown & Sharpe Mfg. Co., of Providence, R.I., show the bathroom facilities and the lavatory conveniences provided by this firm for their numerous employees.

Fig. 63, which was courteously sent to me by the manager of the Westinghouse Machine Company, of East Pittsburg, Pa., shows the enameled iron wash sinks with hot and cold water, which are fitted up for the use of their workmen.

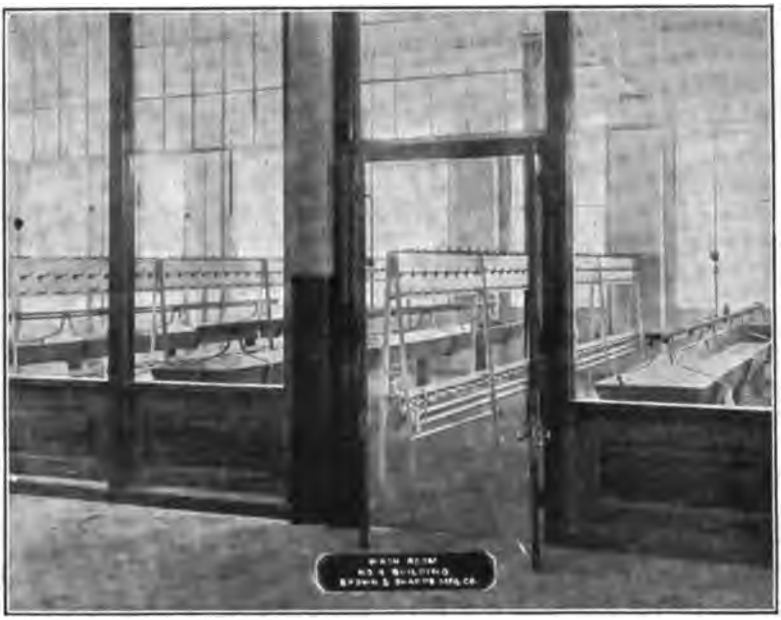
WASH ROOM
NO. 4 BUILDING
BROWN & SHARPE MFG. CO.

Fig. 62. View of Washroom with Sinks in Works of Brown and Sharpe Mfg. Co., Providence, R.I.

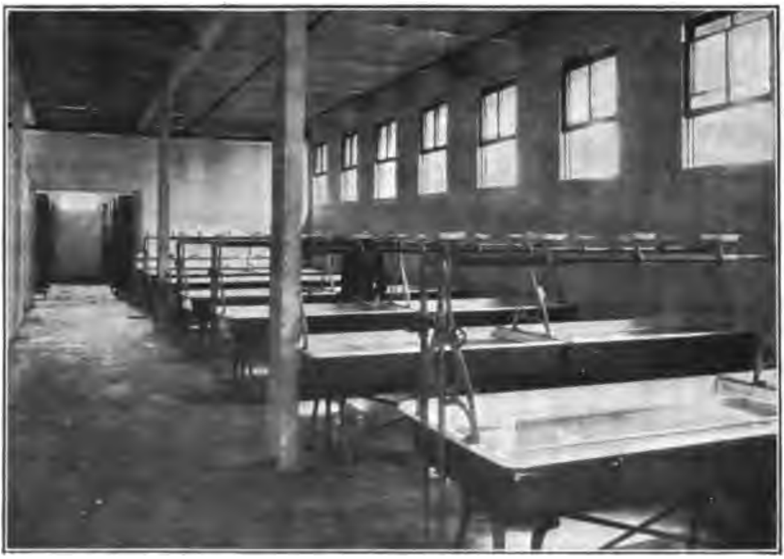

Fig. 63. View of Workmen's Lavatories in Works of Westinghouse Machine Co., East Pittsburgh, Pa.

Some years ago appeared an article in "The Metalworker," describing the

BATHING AND WASHING FACILITIES IN A BROOKLYN FACTORY.

Increased attention is being paid to the proper heating, lighting and ventilation of workshops and factories; employers recognizing that improved conditions in these matters, while ministering to the health and comfort of their work-people, tend also to their own advantage in inducing better work and more of it. This is all matter for congratulation, and very satisfactory so far as it goes. But there seems to be something yet to be learned in respect to the provision of better washing and other sanitary facilities, for, as a general rule, such provision falls far short of what it might be.

Baths are rarely found in American factories, nor any facilities for washing out soiled clothes. Yet the advantages that might be gained, both by employers and employed, in the provision of such comforts are worth consideration. While improving the health and comfort of the men, the refreshment of bathing and enjoyment of clean clothes would undoubtedly give them a greater capacity and energy for their work; body and mind alike would be refreshed, and the refreshment would react upon their laboring qualities. .

In Germany, as we understand, a system of baths and wash places has been adopted with much success in several factories, similar to that in use in the schools and public institutions of that country, namely, the shower or rain-bath system. Results have, it is said, shown a marked improvement in the general health and working qualities of those using them.

The special recommendations of this system are that it is more economical of space; and that men can get a thorough wash-down in a short time — from three to five minutes — with great economy in the amount of water used. It can also be introduced at a comparatively small cost; and, in large industrial establishments, would be found to be of great value to, and appreciated by, the workers, especially those in cities, where facilities for maintaining personal cleanliness at home or elsewhere are often very small.

This matter has, we understand, been in the minds of several employers of labor throughout this country. Among these employers is J. H. Williams, of the firm of J. H. Williams & Co., the well-known makers of drop forgings of Brooklyn, N.Y. After long consideration and investigation, he convinced himself of the material advantages which would result from supplying his men with bathing facilities, and accordingly decided to adopt the shower-bath plan as the best method for overcoming the objections as to cost, space, loss of time, etc., which in this connection were urged with reason against the bathtub system. Taking as his model the "People's Baths" of New York City, he built a similar bath house in connection with his works, which is the first on this principle yet introduced into any American factory.

Space for the new bathing-room was found at one end of the lofty forge-shop in the works of the firm. A new story was "hung on" to the roof, forming a room 50 feet in length and with an average width of 19 feet. On one side of the new room are placed 12 shower baths, consisting of small cubicles with ample room for a man to stand and move in. In each is fixed a large overhead spray connected to pipes conveying hot and cold water. The hot-water pipe is connected with the heating system in use all over the factory, and the cold with the street main. These can be regulated so as to obtain any temperature desired by the bather. A rack with soap is fixed on the wall; and the water is conveyed off by a trough at the side of the room, the asphalt floor having a double incline, which insures the ready flow of water. These bathing compartments occupy but a small floor space, being only 3 feet by 4 feet in dimensions.

It is calculated that the men will take but from three to five minutes in getting a wash-down, so that a number can bathe in rapid succession; a great feature where all wish to bathe at the same time, as would be the case in large factories. The baths would probably be most in request at the close of the day's work, when men do not care to waste their time in prolonged ablutions, and yet can afford sufficient time to get a thorough cleansing by a shower bath on this principle. The water each would use, too, would be but about one-seventh of the amount required for a tub. No attendant is necessary to fill the tubs, etc., and no cleaning up is entailed afterward, as the water runs off immediately, the cleansing being automatic.

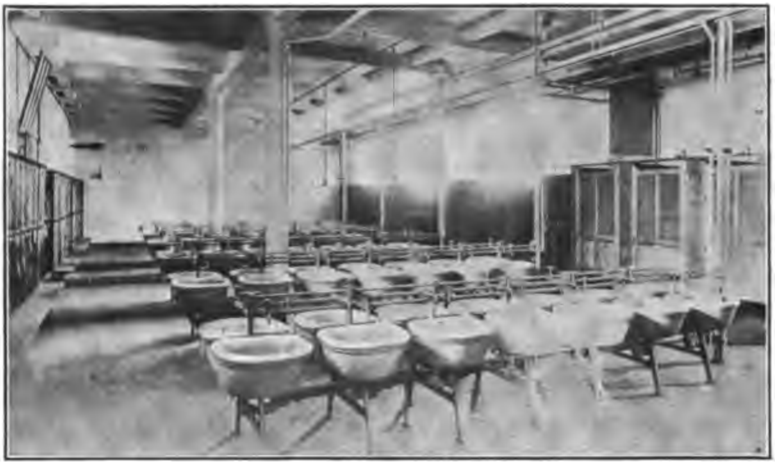

FIG. 64. VIEW OF WORKINGMEN'S LAVATORIES AND SHOWER BATH ROOMS IN FACTORY OF J. H. WILLIAMS & CO., IN BROOKLYN.

There are other advantages in the shower-bath system also, in that no soiled water touches the body, consequently the cleansing is more thorough, and there is no danger, as in the bathtub, of communicating disease. The baths are ready, too, at all seasons and times, and there is little apparatus to get out of order. It is believed that in hot weather the men will often utilize a portion of their dinner

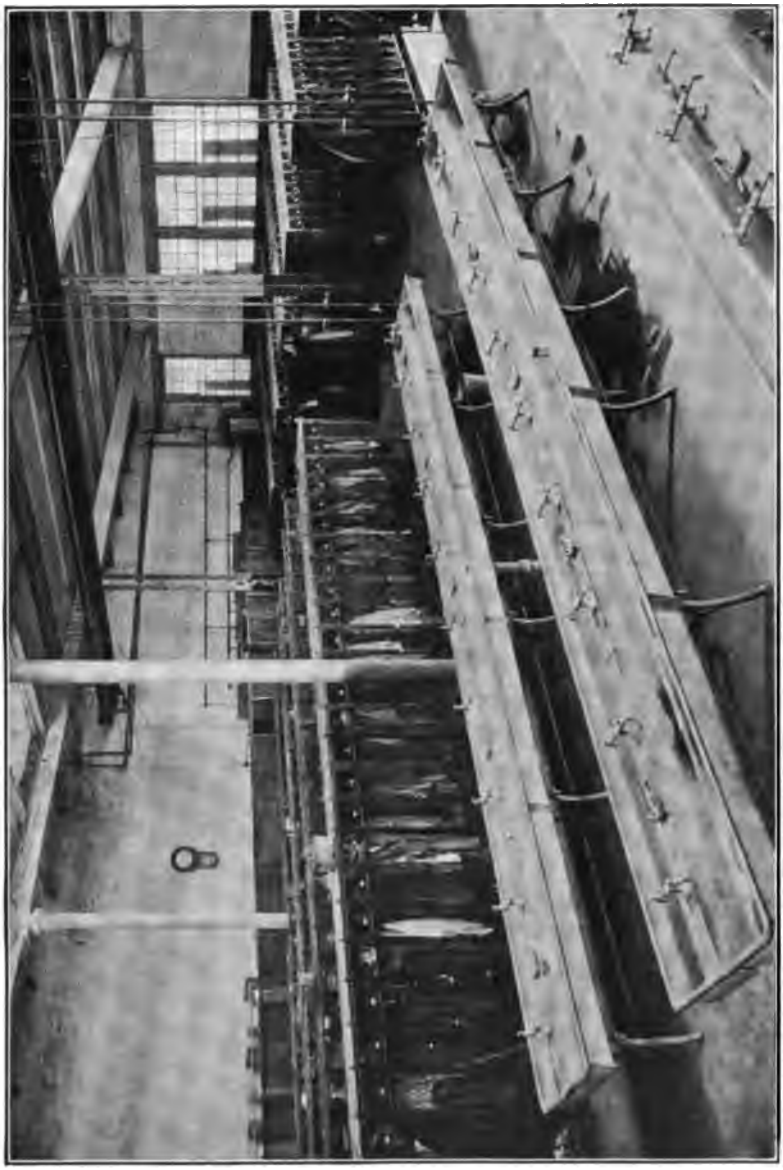

Fig. 65. View of Workingmen's Lavatories in Works of General Electric Co., at Schenectady, N.Y.

time in getting a "refresher" in the bathroom, and will go back invigorated thereby to their afternoon's work.

The system appears to be one that would recommend itself to employers solicitous for the comfort and health of their men. It is also calculated to educate the men in habits of cleanliness and order, and is altogether a step in the right direction.

In addition to the shower baths, which unfortunately do not show in Fig. 64, for which I am indebted to the firm, the washroom is provided with numerous individual solid porcelain lavatories, in which those men can wash themselves who do not require a regular bath.

A matter which has long troubled workingmen is the disposal of their working clothes. These become soaked with perspiration in a place like a forge shop, and when taken off at the day's end must be either carried home to be washed, or hung up in the shop to dry and put on next day in a sour, unpleasant state. In the wash-house a large soapstone sink is provided, where the men can in a few minutes rinse out their soiled garments and pass them through a wringer attached to the side of the trough. A drying closet is placed at the corner of the room, where, by means of hot-water pipes, the clothes are thoroughly dried; and they can thus be put on next morning clean and fresh, — a great boon to men who work in the heat of a forge shop, and are constantly in a condition of sweat, which soaks the clothes in which they work.

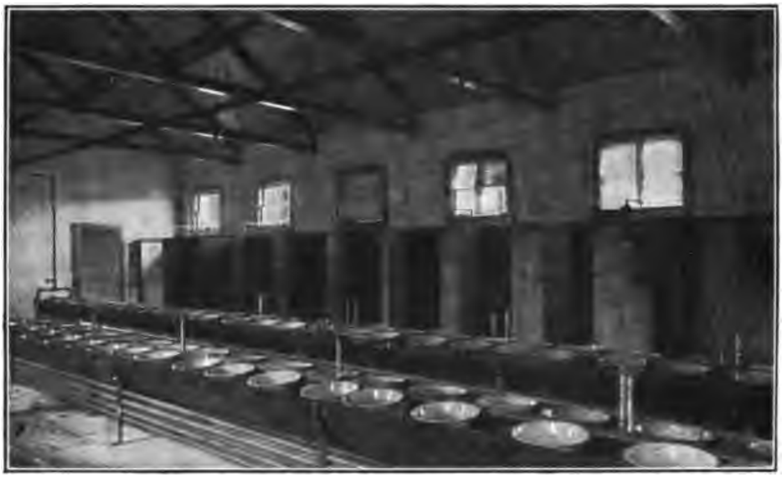

Fig. 66. View of Workingmen's Lavatories and Shower Baths at Works of Cleveland Cliffs Iron Co., at Ispheming, Mich.

Opposite the bathing compartments is a double line of lockers, 80 in all, in which the men can stow their clothes. These lockers are high enough for hanging garments, and are provided with hooks and a shelf for small articles.

Mr. Williams believed that the bathing and washing facilities which he gave to his men would prove a good investment in the increased returns of work done, At the same time he regards it as a still wider question, affecting the community at large. His opinion on the subject is briefly put in his own words thus: "As it is acknowledged that habitual bathing prevents disease, and promotes health and morality, baths for working people affect all classes of society. Employers are, therefore, under moral obligations to supply such facilities, and health, decency and humanity demand it, because few opportunities for personal cleanliness are afforded to any but the privileged classes!"

Fig. 65 is an illustration of the wash and locker room in the Schenectady Works of the General Electric Company, which I am enabled to reproduce through the kindness of the company's general manager.

Fig. 66 gives a view of the shower baths and lavatories for workingmen provided at the works of the Cleveland Cliffs Iron Co., at Ispheming, Mich. The photograph from which the illustration was made was sent to me by the works' manager, who kindly consented to its use in this chapter.

CHAPTER X

SCHOOL BATHS

EXPERIENCE teaches that the air of schoolrooms becomes badly contaminated by the emanations from the children's bodies and by the odors of their clothing. All attempts to improve the sanitary condition of schools will fail to accomplish their object thoroughly, if means are not provided in the school to cleanse the bodies of the children. Cleanliness of school children will make the ventilation of the classrooms a problem easier to solve, and further than that, it will tend to increase the appreciation of cleanliness in the poorer classes, and thus indirectly stimulate bodily — and often moral — purity in the home circle.

The first one to suggest the advantages and necessity of school baths was, I believe, Dr. Alfred Carpenter of Croydon, England. In his lectures on "Preventive Medicine in Relation to Public Health," delivered in 1877, he discussed the subject as follows:

> Every public elementary school ought to have a proper washing place, so that the children might wash the whole of the body at least twice a week, as well as their hands and face. There should also be a washing place for clothes, with a drying closet attached, which should dry the clothes as quickly as possible, and be so arranged that cloth clothes might be cleansed and disinfected, as well as linen clothes washed.
>
> Is the custom of wearing the same dirty garments day after day, getting daily more filthy, an unavoidable one? It is this custom which makes the air of rooms so unwholesome in which the lower classes of children assemble, and which frequently produces the first seeds of evil in the constitution, especially when they go into the room damp from the effect of a drizzling rain. Every one accustomed to a badly ventilated schoolroom knows that it is the smell from damp and dirty clothes which is the principal source of the offensive atmosphere. Even if the clothes will not wash, an exposure in the drying closet to a temperature of 350 degrees will not hurt their texture, whilst it will entirely destroy any lurking seed of infectious disorders which might be clinging to them, as well as destroy the seed beds themselves; and in the possible case of infection being brought into

> the school in the clothes, would, in the majority of instances, prevent it from spreading among the pupils. . . .
>
> I contend that a public elementary school should possess:
>
> (1) Access to a bath, in which every child should be required to bathe twice a week. Every day would be better still.
>
> (2) A washing place, in which they should be obliged to wash daily.
>
> (3) A room in which the hair should be combed and the head cleaned every day, and oftener if necessary. These operations should be superintended by some person, who should see that the elder children attended to the younger as well as themselves, and so teach them to be careful of others.
>
> (4) A laundry, in which the clothes which required it could be washed.
>
> (5) A drying closet, capable of being heated to 400 degrees Fahr. in which washed clothes and also all damp garments could be quickly dried. This would be a great boon to the children on wet days.
>
> I contend that all these are necessary for the education of the great mass of our poor, as much as, if not more than, a knowledge of geography and astronomy, or even history. It will be impossible for the people to be godly until they are instructed in the way of cleanliness. Cleanly children will acquire a dislike for personal dirt and retain it to the end of their lives. They will make more effort to raise themselves from below the level of brutes to that of Christians than they otherwise would do if allowed to remain accustomed to filth. Use becomes second nature, and second nature in a century or two becomes instinctive.
>
> It is only by educating our poorer classes in cleanliness in early life that we shall make them, as a whole, love it for its own sake, and hate dirt and those habits which tend to make man lower than the beasts of the earth, too often now arising from an acquaintance, an intimate association with dirt and dirty homes among the poor. Poverty may be clean, and with cleanliness the first step will have been taken to do away with the evils which follow in its train, and that health secured which riches without cleanliness cannot possibly purchase.

Of the three types of baths, namely, the tub bath, the spray bath and the swimming bath, the first named, viz., tubs, are not well adapted or suitable for schools, as a very large number of fixtures would be required to bathe all the children. The space for so many tubs cannot always be found in a school building, and the bathing process would naturally be slow and result in serious inconvenience. Bathtubs would likewise require the outlay of a vast sum of money.

Swimming baths in schools would be good, as far as giving an opportunity for bodily exercise is concerned. For a cleansing bath, however, as I have explained in earlier chapters, the swimming bath is not well suited, and here again the tepid shower or rain bath offers immense advantages.

To Professor Fluegge and to Mayor Merkel, of the German university town of Goettingen, belongs the credit of having first tried the experiment of rain baths in the public schools, about the year 1885.

In German schools, groups of children are bathed together, and care is taken not to give the baths at the end of the school session, so that the children will not catch cold in going home. After some use of the baths, it is found that the children enjoy them; that their minds become more active and attentive; that the baths induce better cleanliness in clothing and underwear; that the parents pay more attention to the cleanly appearance of their children; and finally, that the air of the schoolrooms is greatly improved.

At first, some teachers and Boards of Education raised trivial objections to the introduction of bathing in the schools. They claimed that the school was not the place to educate children to appreciate the cleanliness obtained by bathing, that this belonged to the family; fear was expressed lest the children should catch cold, whereas experience has proven that the bath hardens the body; others objected to the cost, claiming that people's baths and not school baths were required; a few, finally, objected to the bathing being made compulsory, while experience in the schools demonstrated the fact that the children soon all became eager to bathe.

In German schools bathing has quickly become very popular, and the movement is rapidly extending in all large cities, so much so that recent new school buildings are rarely erected without rain baths for boys and girls in the basement.

In this country there are as yet comparatively few school baths. One of the first school rain baths was erected in a high school at Scranton, Pa., some years ago. Quite recently the newer public schools in New York City and in Boston have been provided with spray baths which are, I believe, quite successful.

At Manistee, Mich., a company erected people's baths on the rain-bath principle in 1885, and one of the aims of the company was to get as many children as possible to take regular baths by distributing free tickets to the school children.

From a paper in one of the Michigan State Board of Health reports I learn that while the Emiline Bath Company, of Manistee, furnishes tub baths to those who desire them, it heartily recommends the shower bath as preferable, enumerating the following advantages:

> (1) In cases where one bather follows immediately after another the atmosphere of the shower-rooms is the purest, as the spray from the shower absorbs the impurities of the air and carries them into the sewer on the same principle that the rain purifies the air outside.
>
> (2) The patron of the shower bath does not come in contact with anything that the former occupant came in contact with, except the rack which he stands upon, and the seat which he sits upon. This seat is varnished with shellac, and may be showered by the occupant.
>
> (3) The water of the shower bath is continually changing, so that the bather is using fresh water to every part of the body.
>
> (4) The occupant of the shower-room has easy access to all parts of the body, owing to the upright or sitting posture.
>
> (5) The occupant of the shower bath has no resistance of water pressure to contend with, while in the tub bath the feet and that portion of the body resting upon the bottom of the tub are under the pressure of nearly one-half pound to the square inch, which of course to a certain extent resists the throwing-out process of the pores.
>
> NOTE. — The E. B. Co. does not recommend the use of soap. Instead, one-fourth ounce of salts of tartar and one-fourth ounce of borax to one quart of water is found to produce an alkaline sufficiently strong to cut the oil of the body, and at the same time the borax is found to have a cooling effect on the skin.

In February, 1885, a Sub-Committee on Baths and Lavatories of a Citizens' Committee in New York City made a report, recommending the erection of people's baths in the tenement districts, and also advising the equipment of public schools, wherever practicable, with baths in the basements. The committee favored the adoption of the rain-bath system, "because the cost of erection is very moderate and because the system is characterized by cleanliness and simplicity."

In a chapter on "The Proper Arrangement of Bath Apartments" in my work, "Sanitary Engineering of Buildings," published in

1899, I commented on the desirability of providing rain baths in our public schools in the following words:

"I hope in the interest of the coming generation of our American school children that some pen, more facile and powerful than my own, will make a strong plea to our Boards of Education in favor of spray baths in the public schools."

A year after writing this sentence it fell to my lot to make such a plea, arguing in favor of school baths at the annual meeting of the American Social Science Association, held in the city of Washington, D.C., on May 7, 1900. My paper was subsequently printed in the Journal of the Association, also distributed as a separate reprint, and was widely read. Quite a few spray baths were fitted up in schools as a result of the plea.

This paper has been out of print for some time, and as there has been quite a demand for it, I reprint it here in full, with its accompanying illustrations, trusting that the reader will overlook a few repetitions which become unavoidable.

A Plea for Rain Baths in the Public Schools

Sanitary science teaches that infectious diseases can best be prevented by the speedy and regular removal of all dirt and waste refuse from the centers of population. This axiom applies not only to our city streets and habitations, but also to the human body. One of the functions of the skin is to continually secrete waste products from the body. During this process the outer layers of the skin are continually cast off and renewed. The clothing which civilized human beings wear forms an obstruction to the immediate removal of the dead and cast-off matter, hence the skin excretions are retained on the same longer than is desirable. The waste matters form an incrustation on the skin, are then subject to decomposition, give off bad odors, and impair the proper function of the skin. The chief reason for wearing underwear is to prevent the skin dirt from attaching to the outer clothes, but some of the dirt remains in the undergarments until these are sent to the laundry. Bacteriologists have discovered in such clothes not only dirt and layers of the skin, but also many bacteria and disease germs. It is obvious, then, that both the skin of persons and their underclothing need frequent cleaning, the one in the bath, the other in the wash.

Among the chief causes of air contamination in schoolrooms are, first, the lack of bodily cleanliness of many school children, and, second, the dirt accumulated both in the pupils' underwear and also in their outer garments.

Ventilation of rooms is usually understood to comprise means for the removal of foul air and for the introduction of a sufficient quantity of purified air, warmed during the winter season, and admitted in such a way as to avoid any draft. I assert, however, without fear of contradiction, that in schoolrooms the best system of ventilation must fail to remove entirely the odors arising from unwashed bodies and from unclean garments. It is a matter of common observation that the air of a classroom can be rendered much purer by a removal of the pupils during recess and by some energetic air-flushing accomplished by opening all windows, than by the best ventilating system, and this for the obvious reason that two of the chief sources of air pollution — the children themselves and their clothes — have been removed. Therefore it follows that the above, generally accepted definition of "ventilation" is imperfect, that something more is required than the mere introduction of pure air and the removal of foul air. What we must do, in ventilating rooms or audience halls, is to *remove entirely, or to keep out, all direct sources of impurities which contaminate the inside air.* Applied to buildings in general, this means that plumbing fixtures, traps and pipes, which may contain sewer air, must be made free from defects or leaks, that gas leaks likewise must be repaired, and that there must be no accumulations of organic waste matters, such as garbage. In schoolrooms, in particular, it points to the desirability of frequent and thorough ablutions of the children. Incidentally it shows that it is desirable to remove from classrooms the usual wardrobes for the overcoats, head coverings, umbrellas and rubber shoes of the pupils. Even where such wardrobes are provided with special ventilating flues, the odors from a large number of damp clothes are apt to assert themselves unpleasantly. It is vastly better to arrange the wardrobes in the corridors outside of the classrooms, or else to provide special hat and coat rooms for pupils near the entrance halls of the school. The ventilation system adopted for a schoolhouse, whatever it may be, can be a success only if all sources of noxious emanations are done away with.

The purpose of my paper is to advocate the introduction and establishment of "rain baths" in the public schools. I do not wish to be understood as considering school baths an absolute necessity in *all* public schools. Some school buildings are located in good neighborhoods, and are attended by the children of people who are tolerably well-to-do, and in whose homes cleanliness can be, and is usually, attained. Public schools located in the tenement districts, on the other hand, are very much benefited if some method of bathing the children during school hours is provided, for the largest percentage of the tenement-house population must go without a bath the year round. In the narrow, dark and ill-ventilated quarters which they call their "homes" opportunities are seldom afforded for thorough ablutions.

Some years ago Dr. Hunter Stewart of Edinburgh read a paper entitled "Ventilation of Public Schools," in which he suggested the establishment of "soap and water" baths in schools, assuring his audience that "the use of such would go far to purify their atmosphere." Dr. Oscar Lassar, one of the earliest champions of the rain bath, asserted that the air of theaters and audience halls generally was polluted not so much by the products of gas illumination and the respiratory process as by the noxious exhalations emanating from ill-kept skins, and intensified by the heat due to the crowding together of many persons.

The late sanitarian, Sir Edwin Chadwick, in advocating school baths said, "Of the lessons that may be taught in the schools, the practice of cleanliness is of the highest order." In a review of the progress of sanitation during the year 1888, he called attention to the new bathing apparatus especially applicable to schools by which a child may be completely washed in three minutes. "Look at the comparative sanitary result of the washed children of a whole school," he says, "as against the common one of the fouled air and badly washed children. Look at the service to the poor mother who has no means of washing." From Kotelmann's book on "School Hygiene" I quote as follows:

> If cleanliness does not prevail in the schoolroom, and the air is constantly being polluted by filth, no amount of ventilation will prove sufficient. Cleanliness should extend, in the first place, to the pupils themselves. Not only ought their bodies to be scrupulously clean, but also their clothes and shoes.
>
> In connection with this matter the school shower baths, introduced by the City of Goettingen, deserve more attention from higher institutions of learning than they have hitherto received. For one thing they promote the cleanliness of the skin; and for another, they lead the pupil to desire clean underclothing.

These and similar observations agree entirely with those of the writer and serve but to confirm the suggestions made in this essay.

It is a deplorable fact that the children of the poorer classes of a population, who form the largest attendance in the public schools, particularly in the elementary grades, often show an utter disregard for, and lack of, personal cleanliness. In the tenements the children usually have no facilities for bathing and keeping clean. They may wash their faces and hands daily — and this usually, too, in a hasty manner — but the feet are bathed only at rare intervals, and in many cases the main body receives no ablution the entire year. In fact, observation shows that many poor children have not the desire for a cleansing bath at regular intervals, for though we see them flocking to the free floating baths in summer time in cities situated on rivers or near the seashore, they are attracted there solely by the wish to enjoy the refreshing sensation of the bath or to practice swimming.

Assuming, therefore, that school baths are desirable if practicable, the question arises, What form of bath should be used in schools? This is answered by considering the object in view, which is to afford the children inexpensive, quickly applied means for ablutions of the whole body. For such a cleansing bath, warm water and soap are required. The former loosens the outer incrustations of the skin, composed of dirt particles and epithelial cells, while the alkali of the soap cuts the grease excretions and assists in removing them.

Warm baths can be given in large swimming basins, in tubs, and finally by means of simple sprays or showers. Swimming basins are ill adapted for school baths, for they are not only very costly to build and maintain, but they are not intended for washing and ablutions, and the common use of the water in swimming basins involves the possibility of the transmission of infectious diseases. Warm tub baths are likewise unsuitable, for they are more expensive than sprays both in first cost and in maintenance; they require much more space and a very much larger quantity of water. They also require more time in filling and in emptying, and more labor and attention to keep them clean. In the tub the bather is surrounded by dirty water, whereas in the rain bath a constantly fresh stream of water pours down upon his body, and at once flows off to the sewer. In fact, the same arguments which point to the superiority of the spray or rain baths for people's baths are applicable in their entirety to school baths.

I may reasonably assume that sanitarians, and others interested, are acquainted with my former essays advocating the introduction of the rain bath.* Not the least of the advantage of the spray over the tub bath is that it stimulates the action of the skin by the mechanical effect of the drops of water, and hence renders children more active after the bath, more bright, more eager to learn, and makes them show interest in their studies; whereas a bath taken in a tub has the contrary effect, being usually debilitating. The spray bath is both cleansing and stimulating, and if followed by a gradually colder shower subsequent catching cold may be prevented, and the body is hardened against many forms of disease.

The particular form of spray which I would recommend is the shower of tepid water from an inclined overhead rose or sprinkler head, having a large number of perforations, each about $\frac{3}{32}$ inch in diameter. The rain bath is sometimes spoken of as a modern form of bath, while others aptly call it "the bath of the future." Dr. Oscar Lassar, in an essay,* read at the meeting at Cologne, held on Sept. 18, 1898, of the Association of German Naturalists and Physicians, has drawn attention to the fact that a Greek vase, recovered from the excavations at Volci, an ancient Etruscan city, located near the shores of the Tyrhenean Sea, which vase is now said to be in one of the Berlin Imperial Museums, proves that the rain or spray baths were well known to the Greeks. In a description of the new public bath house at Breslau, Prussia, Dr. Kabierske illustrates another Greek vase, on which is represented a woman's bath, which shows clearly that the use of the inclined overhead shower was known to the ancient nations. (See Fig. 67.)

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* See the author's essays on "The Modern Rain Bath," and on "Bathing and Different Forms of Baths."

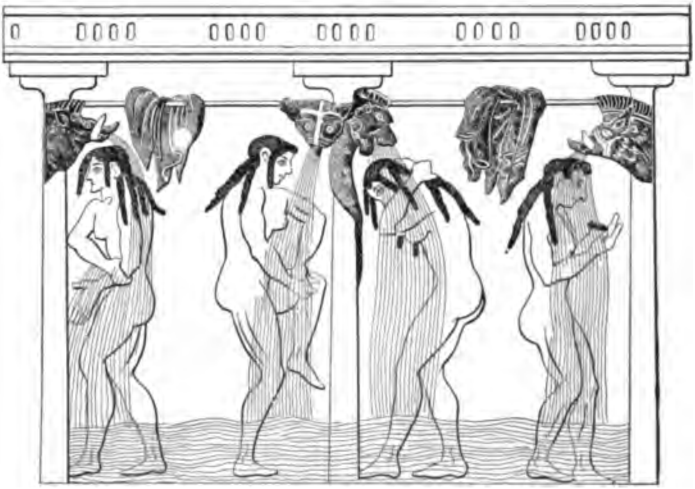

FIG. 67. ANTIQUE VASE SHOWING SPRAY-BATH.

In taking the ground that the spray bath is the best form of bath for use in public schools, I do not wish to be understood as underestimating the beneficial effect of swimming baths.

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* "Die Kultur-Aufgabe der Volksbaeder."

However good swimming as a form of athletic exercise may be, the schoolhouse proper cannot be regarded as the place for practicing such exercises.

The *advantages of school baths* are numerous. In the first place, the school children are offered the opportunity of a weekly cleansing bath, which in most cases they lack in their homes. The children are readily kept clean, and this in turn, as already indicated, is a powerful help in keeping the air of the classrooms free from disagreeable odors. In addition to the direct benefit derived from bathing there is the indirect advantage resulting from the children being taught and brought up to appreciate cleanliness. In the early summer days a dash of water from a cool spray serves to refresh the body and to reduce its temperature. Moreover the bathing together of many children necessarily has the effect of making them more tidy as regards their undergarments. This in turn cannot help exerting a beneficial influence in the children's homes, for parents will naturally strive to keep their children cleaner, and their garments neater, when they know that in undressing together, slovenliness of the dress, or raggedness of the underclothes due to the mother's carelessness or inattention, may reflect unfavorably upon the children. To a certain extent the bathing of children in public schools will exert a beneficial and wholesome influence in fostering habits of cleanliness among the people generally. Above all, the habit of taking baths at regular and frequent intervals, if cultivated and taught during the period of early childhood, is bound to exert a wholesome influence upon the later periods of life.

For all these reasons school baths may rightly be considered to be a moral factor in the education of the young. The results even extend further and include the betterment of their home life and surroundings.

Is it not a fact that, besides being a detriment to health, lack of cleanliness gradually leads to loss of self-respect, to bad habits, vulgarity and vice? In a measure school baths even help to reduce the sharp contrasts which exist between the laboring classes and the well-to-do people.

Experience teaches that a school janitor can readily manage the bathing apparatus and control the bathing of the boys, while the janitor's wife may take charge of the bathroom for the girls. The hour for bathing can be set so that it will not interfere with any important studies, but it is well to bear in mind not to continue the bathing during the last school hour, in order not to expose the children to the danger of catching cold when they leave the school. A very good way to avoid this danger at all times is to have the tepid spray followed by a colder one of short duration, in order to close up the pores of the skin and to harden the body in general.

It may be asked, Are not school baths unnecessary in those cities or city districts where people's baths are maintained by the municipality? In answer, let me state that up to the present time there are not, in any city of the United States, a sufficient number of free baths for the people. In the State of New York, for instance, a law was passed in 1895, making the establishment of free people's baths mandatory, yet no free baths have been added so far to those few which existed prior to the passage of this legislative act, except in some of the smaller cities. In New York City some people's baths are now under construction; in Brooklyn no effort whatever has been made lately to erect any free baths open all the year round. Again, experience in European cities, where it has been the custom to give free tickets for the public baths to the children of the public schools, has shown that neither the children nor the parents appreciate the offer sufficiently.

* * * * * * *

Before presenting some illustrations of plans for school baths, let me say a few words about how the establishment of spray baths in the public schools originated. History informs us that in ancient Greece gymnasia and swimming baths were often attached to schools. In modern times a few of the schools in England were provided, some with tub baths, others with bathing pools. At one of the large Berlin gymnasiums (High School) there is a complete swimming bath, besides five tub baths for preliminary cleaning. The credit of introducing spray baths into the public schools belongs to Professor Fluegge and Mayor Merkel, both of the university town of Goettingen, in Germany.

The first trial was made there in 1885 in one of the public schools by fitting up in the basement a bathroom 8 feet long by 16½ feet wide, an adjoining apartment of the same size being used as a dressing room. The walls were finished with cement, and the floors asphalted and covered with a wooden lattice floor. Three large vertical shower-heads were installed and under each was placed a zinc pan, about 3¼ feet in diameter and about 15 inches high, to which a waste pipe was attached. The showers were arranged to run simultaneously, three children being placed under each. The janitor controlled the mixing of the hot and cold water, and the children were not permitted to touch the valves. Two months after the baths were put in operation, 75 per cent of the children bathed regularly, although the bathing was not made obligatory.

Later on the greater advantage of the *inclined* shower was recognized and it was also found necessary to provide larger dressing rooms, so that twice the number of children bathing could be accommodated. In this way the bathing of a class was quickly accomplished.

The success of the school baths at Goettingen was so great that hygienists, school-teachers and principals, city architects and others visited the new baths in great numbers.

The idea became at once very popular, and in a very short time a large number of German cities provided spray baths in some of their school buildings. I will mention only a few of these out of a large number. In Weimar they were introduced in 1886, and soon out of 1,300 children 910 took the baths. In Magdeburg four schools have spray baths; Koenigsberg has two schoolhouses with baths. Berlin had in 1896 four school baths, Breslau had four in 1887, and since then five more have been installed. Posen has one school bath, Frankfort-on-Main had in 1896 three, Hannover nine such baths, in which about 100,000 baths were given in six years. Cologne has several schools so fitted up, and in Altona a large schoolhouse has a special spray bath pavilion arranged in the center court between the two wings of the school building. More recently school baths were erected in several of the schools of Zurich (Switzerland), also in Copenhagen (Denmark), Christiania (Norway) and in Paris. Wherever such school baths were introduced their success was almost instantaneous and so great that the Boards of Education decided to include baths in the specifications for all new school buildings. At the annual meeting, in 1886, in Breslau, the German Public Health Association passed resolutions indorsing and recommending school baths for public schools, modeled after those first introduced at Goettingen. There is not a single instance on record where the bathing arrangements placed in public schools were put out of use on account of a slim attendance.

In a report on School Hygiene and Schoolhouses, written by Dr. A. G. Young, for the seventh annual report (1892) of the State Board of Health of Maine, the German school baths are referred to as follows:

> The advantages of the school baths observed in European schools are bodily cleanliness of the child, greater care on the part of the parents in keeping the clothes of the school children neat and clean, improvement of the condition of the schoolroom air, again in the physical health of the pupil, and the increase in the mental freshness and activity. There results, therefore, a physical, a moral and an intellectual gain. Moreover, from more than one of the towns where school baths have been opened comes the testimony that a good reflex moral influence has been exerted upon the parents and families of the pupils. . . .
>
> . . . The manifest advantages that have come from the establishment of school baths in the old countries render it evident that their introduction into some of our own city schools is an experiment worth trying.

In the city of Boston school baths were introduced about 1896 at the suggestion of Dr. Edward M. Hartwell, at the new Paul Revere school, designed by Messrs. Peabody & Stearns, architects, at the North End, and soon after at another school at the West End. In the former school 1,000 children bathed in one week. When the baths were first contemplated, the Committee on Schoolhouses reported unfavorably, saying:

> We hesitate to take the position that it is the duty of the school authorities to bathe the children in public schools, because they may not be clean, for if this

> be granted, we see no reason why we should not clothe them if they be improperly clothed, or feed them if they are not properly nourished at home.
>
> But, outside of the legal questions involved, your Committee do not believe that it is in the interest of the public health to place these wash-houses in the basements of our public school buildings, to there accumulate the uncleanliness which may be brought in on the bodies of the children. More or less foul odors must necessarily come from this practice, and your Committee feel that the suggestion that eventually these wash-houses be used for the general public is not in the interest of proper sanitation.

It is to the credit of at least one member of the Committee that he replied to this as follows:

> One would infer that the new Paul Revere Schoolhouse was not to be connected with the sewer at all. One would think that the accumulation of filth was to be kept there in the building. . . . It is perfectly absurd to say that it is impossible in the basement of a public school building, built as you have to build them in that section of the city, that a bath house cannot be provided from which no odor whatever can arise. But, if we must have foul odors, let us have them in the basement and not in the schoolroom. It is not a wash-house at all, by the way, but simply bathing facilities in the basement of a school building.

Later on, the Committee on Hygiene reported favorably, the vote standing eleven in favor and eight against the sanitary measure. Mention was made at this meeting that though the Committee had spent about $4,000 in one school to do away with unclean odors, they did not succeed in getting rid of them.

From the annual report of the School Committee of the City of Boston for the year 1899, I extract the following description of the school baths at the Paul Revere school:

> Not alone is the Paul Revere school notable for its attractive exterior and interior, its artistic decorations and the historic name it bears, but from the fact that it is the first schoolhouse in Boston to contain bathing facilities for pupils. This school is located in one of the most congested sections of the city, inhabited by a dense population, consisting mainly of Hebrews and Italians, with a liberal percentage of other nationalities. . . . It was fitting, therefore, that in this crowded section should first be tried the experiment of school baths. Two sets were installed in the new Paul Revere school, one for each sex, at opposite ends of the basement, which are open every school day. On the girls' side there are ten individual compartments, each containing a seat and a spray. These compartments are of slate on three sides, with the entrance screened by a rubber curtain hung from rings, which can be drawn at the pleasure of the occupant. There are also in the same room thirty dressing closets, each containing a seat, hooks for cloth-

ing and provided with a self-closing blind door. The floor is of concrete covered with movable slatted walks, made in short sections. The "Gegenstrom" system is in use, whereby the temperature of the water may be accurately regulated, and a matron is in daily attendance.

No individual accommodations are provided for the boys, the showers being grouped in a space about ten by fifteen, so that twelve pupils may bathe at the same time. The remainder of the room is used for dressing purposes, an oaken bench running along two sides of the walls, above which are hooks for clothing. This room is in charge of the janitor.

Soap and towels are furnished without expense to the pupils. The arrangements for the use of these accommodations are such as to afford an opportunity to every pupil to bathe once a week throughout the school year, and this is not compulsory. A certain time for bathing is assigned each class, when those pupils who so desire are given an opportunity to avail themselves of the facilities described.

Pupils in the grammar as well as the primary school are admitted to these privileges with the exception of those who are too young to undress and dress themselves without considerable assistance.

The providing of these accommodations is largely due to the effort of Mr. Lewis H. Dutton, the principal of the district, who earnestly advocated the proposition to place baths in this building from the time its erection was first contemplated. Between 125 and 150 pupils bathe daily, and the success of the experiment, as it was termed, seems assured. The estimated expense of conducting the baths, including the salary of the matron, soap, towels, laundry and heat, is about $85.00 per month.

The author has been favored with a courteous letter dated March 17, 1900, from the Superintendent of Public Schools of the City of Boston, Mr. Edwin P. Seaver, from which the following paragraph is quoted:

> The best response which I can make at the present time to your letter of the 16th inst. seems to be to send you a copy of the annual report of the School Committee of this city, recently issued, on pages 28, 29 and 30 of which you will find the subject of baths in the Paul Revere school reported. This is the only printed information I have within reach at present. Speaking generally, the results of these baths have been satisfactory. I think they would be more so if it were possible to put the children into clean clothes after the baths.

In New York City the report of the Mayor's Committee on Public Baths, issued in April, 1897, after describing the German school baths, urged their hygienic importance and stated that the cost of their introduction in the public schools would be inconsiderable. "The basements of our public schools, which are in many cases very little used, are peculiarly fitted for the establish-

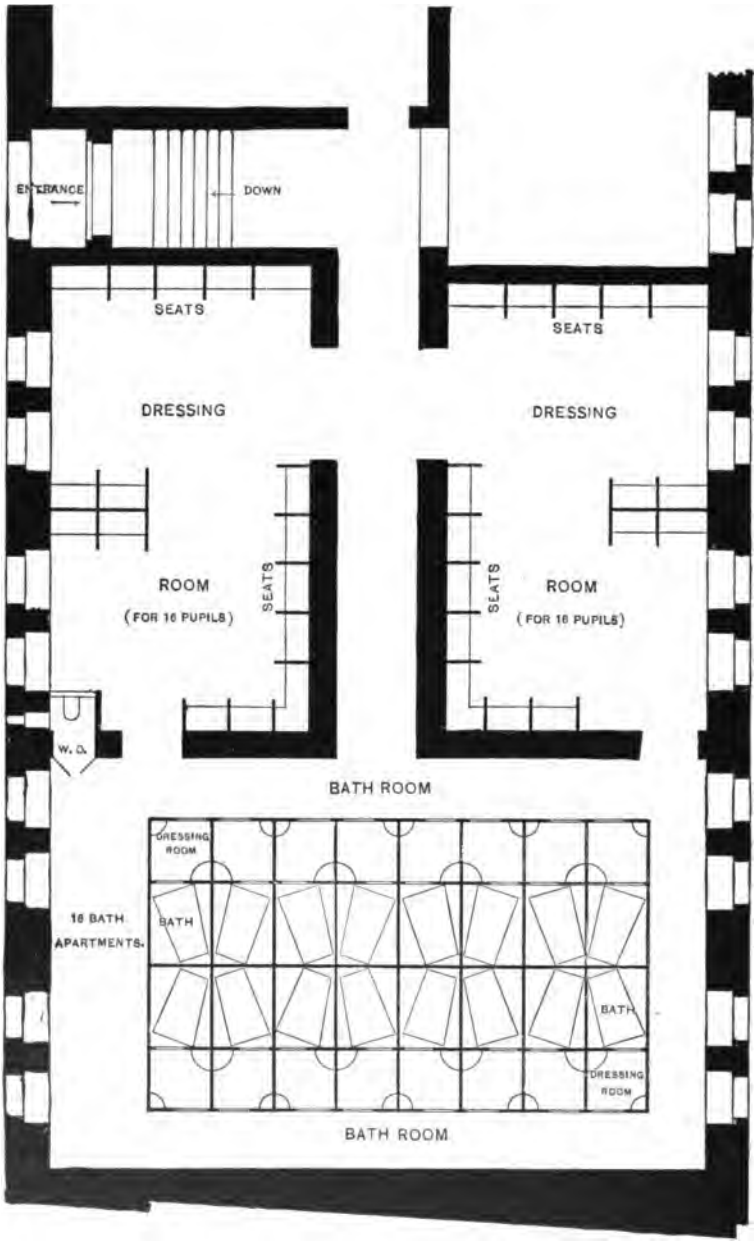
ENTRANCE
DOWN
SEATS
SEATS
DRESSING
DRESSING
SEATS
SEATS
ROOM
(FOR 16 PUPILS)
ROOM
(FOR 16 PUPILS)
W. C.
BATH ROOM
DRESSING ROOM
BATH
16 BATH APARTMENTS.
BATH
DRESSING ROOM
BATH ROOM

FIG. 68. PLAN OF SHOWER BATHS IN PUBLIC SCHOOL AT COLOGNE, GERMANY.

ment of spray baths for school children. Where now the basement is used as a playground, a roof garden playground may be substituted and so a double advantage secured." The Superintendent of Public Schools expressed himself in favor of the baths, but no further move was made in the matter until quite recently. I learn it is now the intention to introduce baths in some of the new school buildings.

The *general requirements of school baths* are as follows: they should be cheap in construction as well as in operation; they should be of such form and arrangement that the cleansing of the body may be accomplished in the least time, with the least quantity of hot water, and in a small space. Both the bathroom and the dressing rooms must be well heated, free from dampness and from dangerous draft, and be thoroughly well ventilated and lighted. The apartments should be light, clean and sanitary throughout. The bathing water should be of crystal-like clearness and purity. The children should be made to feel comfortable and safe, all danger of scalding should be excluded, all steam noises, which are liable to frighten children, should be avoided. Plenty of time should be afforded for undressing, washing and spraying, drying and dressing, for boys from twenty to twenty-five minutes, for girls about half an hour. As the stream from a vertical shower upon the head is felt unpleasantly by many bathers, the sprays should be set inclined. Participation in bathing must be entirely voluntary.

The zinc pans, originally used in the German school baths, were soon done away with. It was found to be much better to arrange the entire floor of the bathroom with a pitch to a floor cesspool, or gutter with waste pipe to the sewer. The placing of several children under one large shower is not as good as providing separate smaller sprays for each bather; the distance between the showers should be from 2½ to 3 feet, to give each child plenty of freedom in the movement of the arms.

In the *plans of school baths* accompanying this chapter, Fig. 68 and Fig. 69 show examples of school baths as arranged in schoolhouses at Cologne and Munich. It will be noticed that entirely

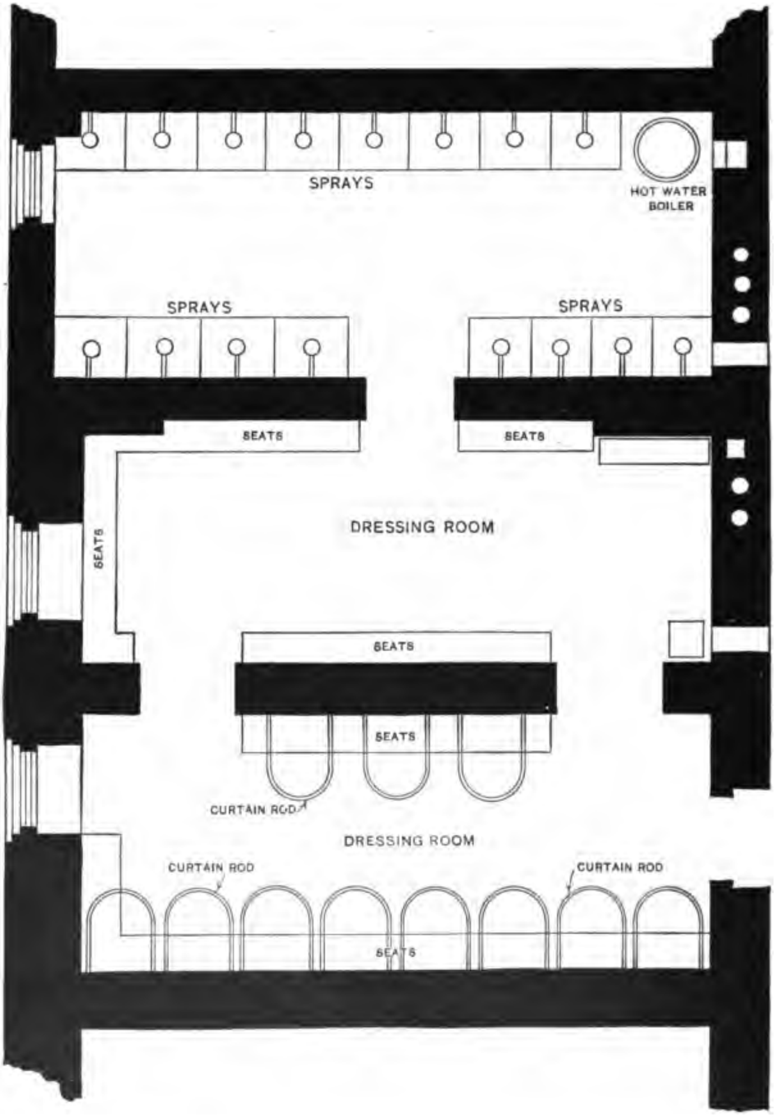
SPRAYS
HOT WATER BOILER
SPRAYS
SPRAYS
SEATS
SEATS
SEATS
DRESSING ROOM
SEATS
SEATS
CURTAIN ROD
DRESSING ROOM
CURTAIN ROD
CURTAIN ROD
SEATS

FIG. 69. PLAN OF SHOWER BATHS IN PUBLIC SCHOOL AT MUNICH, GERMANY.

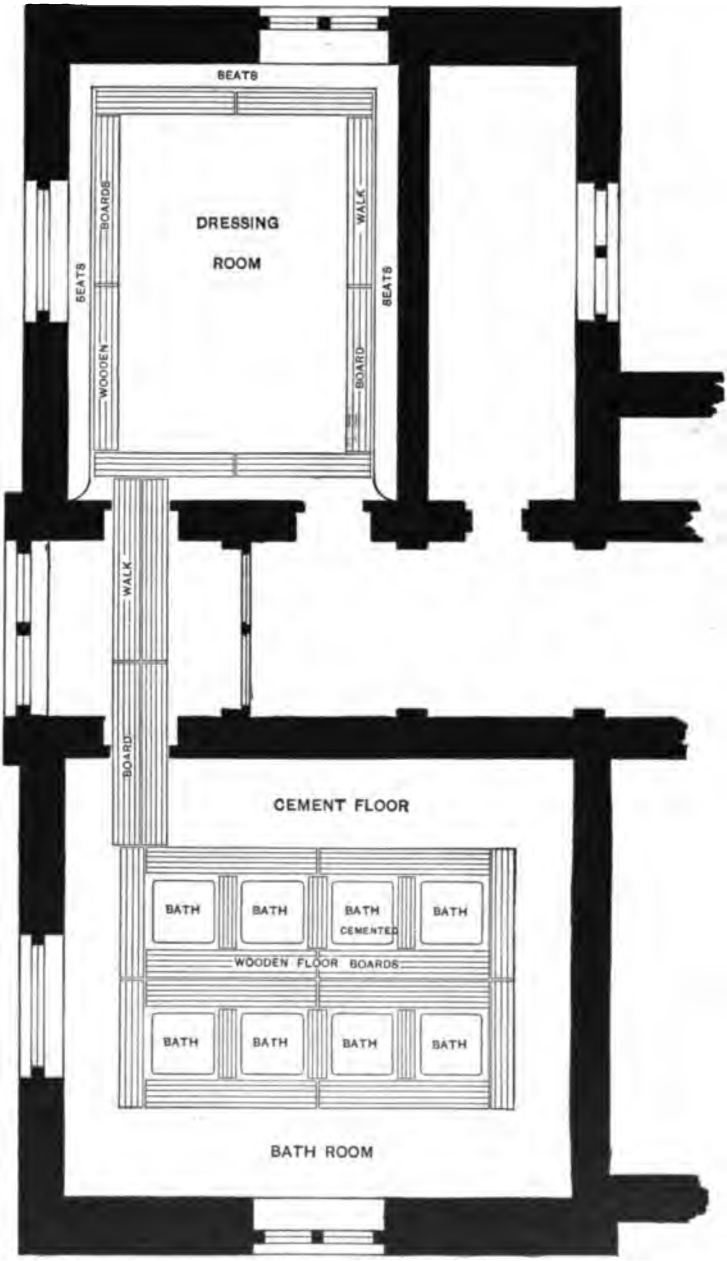
SEATS
DRESSING
ROOM
SEATS
WOODEN BOARDS
WALK BOARD
SEATS
WALK
BOARD
CEMENT FLOOR
BATH
BATH
BATH
CEMENTED
BATH
WOODEN FLOOR BOARDS
BATH
BATH
BATH
BATH
BATH ROOM

FIG. 70. PLAN OF SHOWER BATHS IN PUBLIC SCHOOL AT WIESBADEN, GERMANY

separate bathing cells are provided for each child at Cologne (Fig. 68), while in the Munich school (Fig. 69) the larger children have separate spaces, enclosed with curtains, for undressing. It would seem to me that baths like those shown in Fig. 70, which illustrates the basement of a school in Wiesbaden and like Figs. 71 and 73, which show the proposed arrangements of school baths for larger schools, with separate bathing accommodations for boys and girls, designed by the writer, are far preferable. In

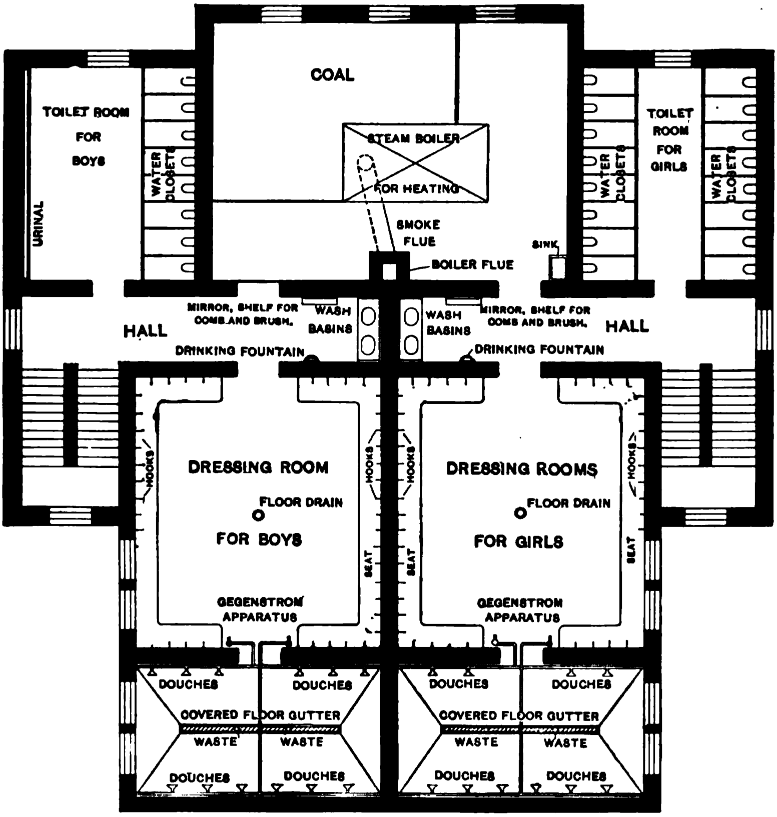
COAL
STEAM BOILER
FOR HEATING
SMOKE FLUE
BOILER FLUE
SINK
TOILET ROOM FOR BOYS
URINAL
WATER CLOSETS
TOILET ROOM FOR GIRLS
WATER CLOSETS
HALL
MIRROR, SHELF FOR COMB AND BRUSH.
WASH BASINS
DRINKING FOUNTAIN
HALL
WASH BASINS
MIRROR, SHELF FOR COMB AND BRUSH.
DRINKING FOUNTAIN
DRESSING ROOM
FLOOR DRAIN
FOR BOYS
GEGENSTROM APPARATUS
HOOKS
SEAT
DRESSING ROOMS
FLOOR DRAIN
FOR GIRLS
GEGENSTROM APPARATUS
HOOKS
SEAT
DOUCHES
COVERED FLOOR GUTTER
WASTE
DOUCHES
COVERED FLOOR GUTTER
WASTE

FIG. 71. AUTHOR'S PLAN FOR PROPOSED SPRAY BATHS FOR A PUBLIC SCHOOL.

both of these the bathroom is entirely free and not divided into separate apartments. The plan of the Paul Revere school in Boston appears, from the description, to be a compromise between the two systems.

A general bathroom can be cleaned much better and quicker if the subdivisions into compartments are omitted. I also hold that the educational effect of having the children undress together in one large dressing room should not be entirely lost sight of, for as already intimated this fosters habits of neatness as regards the under-garments. For the older girls it may be desirable, as has been done in the Boston school, to provide simple curtains for greater privacy in dressing and undressing.

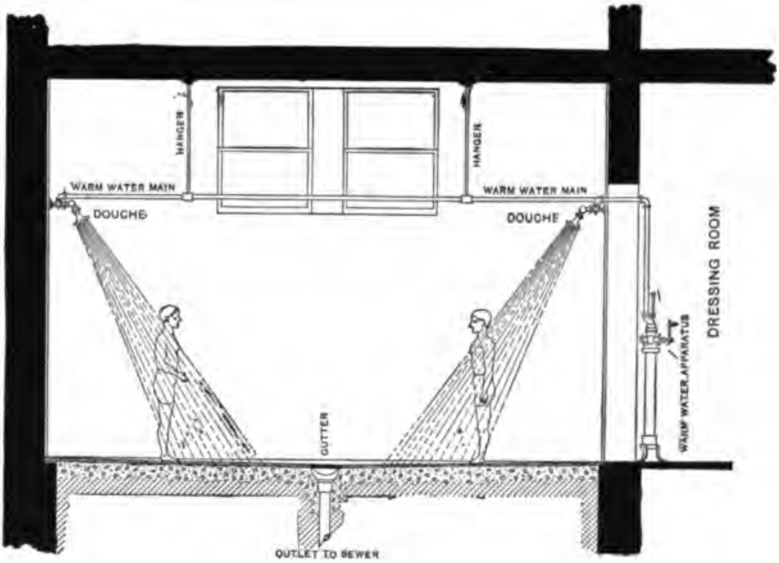
HANGER
HANGER
WARM WATER MAIN
WARM WATER MAIN
DOUCHE
DOUCHE
DRESSING ROOM
WARM WATER APPARATUS
GUTTER
OUTLET TO SEWER

Fig. 72. Cross-Section Showing Arrangement of School Spray Baths as per Plan Fig. 71.

Where, in a co-educational school, separate bathrooms cannot be provided for boys and girls, the bathing may be so arranged that the boys and girls bathe on alternate days.

It is usual to have the children bring with them their bathing towels, combs and brushes, but soap should be given by the school. The older children may be allowed to put on short bathing tights or loin aprons, though the necessity for using these hardly exists. It is desirable to arrange a suitable clothes-drier for drying the towels used by the children. The bathing proper should not last more than from five to ten minutes; the temperature of the water should be about 97° to 98° in winter and about 85° in summer. It is well to provide a few showers for cold water, which, as already recommended, should be taken at the end of the bath as a protection from cold.

This chapter does not intend discussing purely technical details, such as the means for heating the bath water and the mixing apparatus for the sprays. I present, however, in Fig. 72, an illustration, showing in a vertical section the arrangement of a number of sprays in school baths, controlled and supplied from one mixing apparatus.

Fig. 73 shows the plan of another rain bath planned by the author for use in public schools. It will be seen that the basement of the schoolhouse contains a boiler and coal room, a janitor's office and a workshop. The girls' staircase, hall, water-closets, play room, wash room, dressing room and spray baths are located on one side, while the opposite side of the building has a similar arrangement for the boys.

The two bathrooms are placed immediately adjoining the dressing rooms. Each bathroom is fitted up with eight sprays, and these are placed in one row, with a distance of three feet from center to center of each shower.

One Gegenstrom apparatus supplies eight sprays with tepid water; it is located in the dressing room, and is intended to be operated by the janitor on the boys' side and by the janitor's wife on the girls' side. With the apparatus provided, the sprays run with tepid water of not exceeding 110° temperature, and usually, towards the end of the bath, a colder shower is administered in order to protect the children from catching cold.

Passing on to the *objections* brought forth against school baths, these may be said to come largely from men who are unfamiliar with their operation, and who have never witnessed the bathing of children under douches of tepid water, either in people's or in school baths. The objection arising from the fear that the basement of a schoolhouse may become filthy is too absurd to deserve further notice. It is sometimes argued that bathing belongs to the home, and not to the school, but what if the home is not provided with bathing facilities? And again, where cleanli-

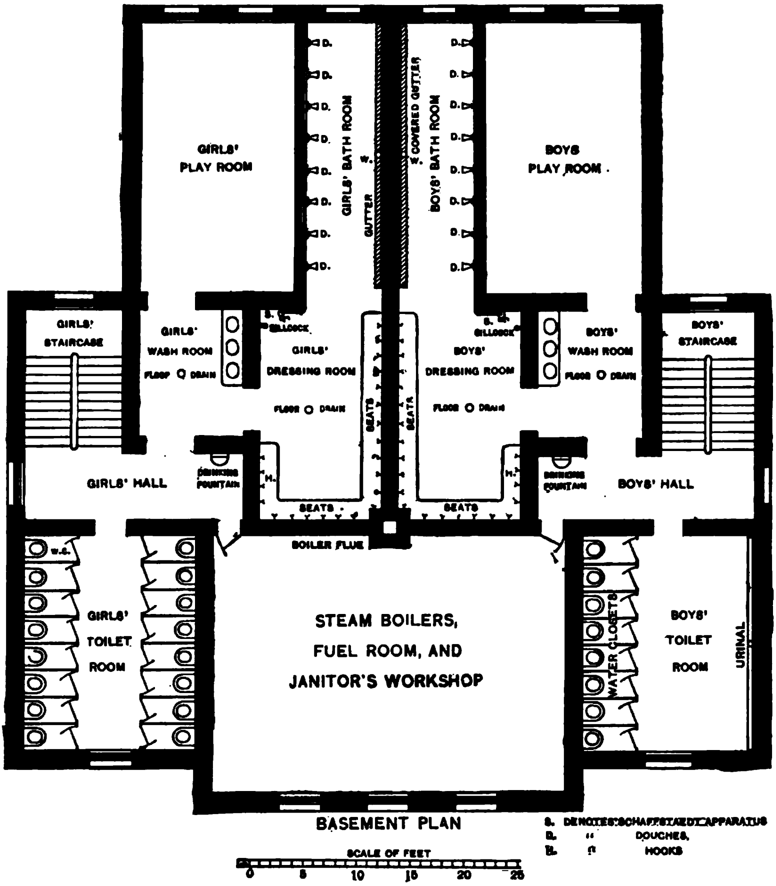
GIRLS' PLAY ROOM
GIRLS' BATH ROOM
GUTTER
W. COVERED GUTTER
BOYS' BATH ROOM
BOYS PLAY ROOM
D.
W.
GIRLS' STAIRCASE
GIRLS' WASH ROOM
FLOOR O DRAIN
S.
BALLCOCK
GIRLS' DRESSING ROOM
FLOOR O DRAIN
SEATS
SEATS
BALLCOCK
BOYS' DRESSING ROOM
FLOOR O DRAIN
BOYS' WASH ROOM
FLOOR O DRAIN
BOYS' STAIRCASE
GIRLS' HALL
DRINKING FOUNTAIN
H.
SEATS
SEATS
DRINKING FOUNTAIN
BOYS' HALL
BOILER FLUE
W.C.
GIRLS' TOILET ROOM
STEAM BOILERS, FUEL ROOM, AND JANITOR'S WORKSHOP
WATER CLOSETS
BOYS' TOILET ROOM
URINAL
BASEMENT PLAN
SCALE OF FEET
0 5 10 15 20 25
S. DENOTES SCHAFFSTAEDT APPARATUS
D. " DOUCHES.
H. " HOOKS

FIG. 73. AUTHOR'S PLAN FOR PROPOSED SPRAY BATHS FOR A PUBLIC SCHOOL.

ness is, perhaps, taught the pupils in school courses on Physiology and Hygiene, is it not better to go a step further and let them learn in a practical way cleanliness and neatness in the school bath?

Some raise the objection that it would be unwise to *compel* children to bathe, but experience teaches that, although bathing was nowhere made compulsory, the largest percentage of the children — 90 per cent and over — become eager to have a bath at least once a week. Others fear the danger of exposing the children to colds, but if properly carried out, bathing in schools is less dangerous in that respect than bathing in the people's bath houses, for here the children leave the building immediately after the bath, whereas in schools the bathing can be arranged in the middle of the morning or afternoon studies, and not during the last school hour. Others, finally, argue in favor of establishing and maintaining free public baths, but consider school baths unnecessary, where the former are abundantly provided. Would it not be more sensible to arrange the school baths so they could be used after school hours by adults like the public baths, by simply providing separate outside bath entrances in schools?

In all sections of this country, as in most other civilized and progressive countries, great attention is being paid to school sanitation. But, though much care is here devoted to lighting, ventilation and heating, to drainage and furniture in the schoolroom, comparatively little attention has hitherto been paid to the requirements of bodily cleanliness of the pupils. In the best modern schoolhouses, sanitarily planned, drained and ventilated, children are brought together who may, and often do, carry on their bodies and in their clothing the germs of infection. It was this very observation which compelled the hygienist Professor Fluegge, of Goettingen, after an examination of the healthful and clean school interiors of his city to exclaim: "Of what good are all these modern sanitary arrangements when dirty children, with disease germs lurking on their bodies or in their clothes, are brought into these healthful classrooms!"

Now that the introduction of school baths has been repeatedly tried, so that it can no longer be called an experiment, we should not listen to voices which would deprive the children of an advantage the influence of which is sure to be far-reaching. All such attempts at blocking sanitary progress in school hygiene should be discountenanced.

Teachers are unanimous in asserting that school baths are beneficial, that they foster bodily vigor, brighten the minds of the pupils, increase the interest in the studies, dispel laziness, improve the air of class rooms, and increase neatness, cleanliness and decorousness, as well as the general health and happiness of pupils.

School baths are, consequently, destined to become useful factors in the welfare of the present and coming generations. May the day not be far off when every American public schoolhouse, attended by the children of the poorer classes, is fitted up with a sufficient number of spray baths!

CHAPTER XI

BATHS FOR MILITARY BARRACKS, ARMORIES, PRISONS, JAILS AND POLICE STATIONS

FOR armories and military barracks, tub baths have repeatedly been tried and found impracticable; they were abandoned largely because of their expense. While soldiers' swimming baths are excellent in affording opportunities for bodily exercise, no system is so well adapted for military buildings as the rain or spray bath. This fact became apparent many years ago; in fact, spray baths have been used in such buildings for cleansing purposes long before they were adopted for people's bath houses. Dr. Dunal, a surgeon in the French Army, Dr. Bresgen and Dr. Muennich, surgeons in the German Army, and Dr. John S. Billings, late of the United States Army, introduced or recommended this form of bath and expounded the advantages of the rain bath.

It is obvious that the advantages of the rain or spray bath over the tub bath apply also to the bathing of prisoners. In some of the State prisons the inmates are given weekly baths by means of flexible hose or hand sprays. The fixed overhead inclined shower is a vastly better arrangement, for two reasons: first, it does away with an attendant to spray the prisoner; second, a fixed spray, under which the bather places his body voluntarily, does not give rise to the popular belief, which results from the use of a flexible hand spray in the hands of the attendant or prison keeper, viz., that the prisoners are often sprayed with cold water as a means of punishment.

A great advantage of the rain bath in military barracks is that it permits of the quick bathing of large numbers of soldiers. The same is true of rain baths in prisons.

The plan, shown in Fig. 74, was prepared by me to illustrate a large bath house adapted for military barracks and prisons.

The bathroom contains four rows of eight baths each, or 32 bath units in all. In the center of the room, at the two side walls, and also at the wall opposite to the entrance, there are provided six rows of seats, affording a total seating capacity of 96 seats. Consequently the number of seats is to the number of sprays in the proportion of 3 to 1. The bath compartments are suitably numbered, and three adjoining seats are always given the same

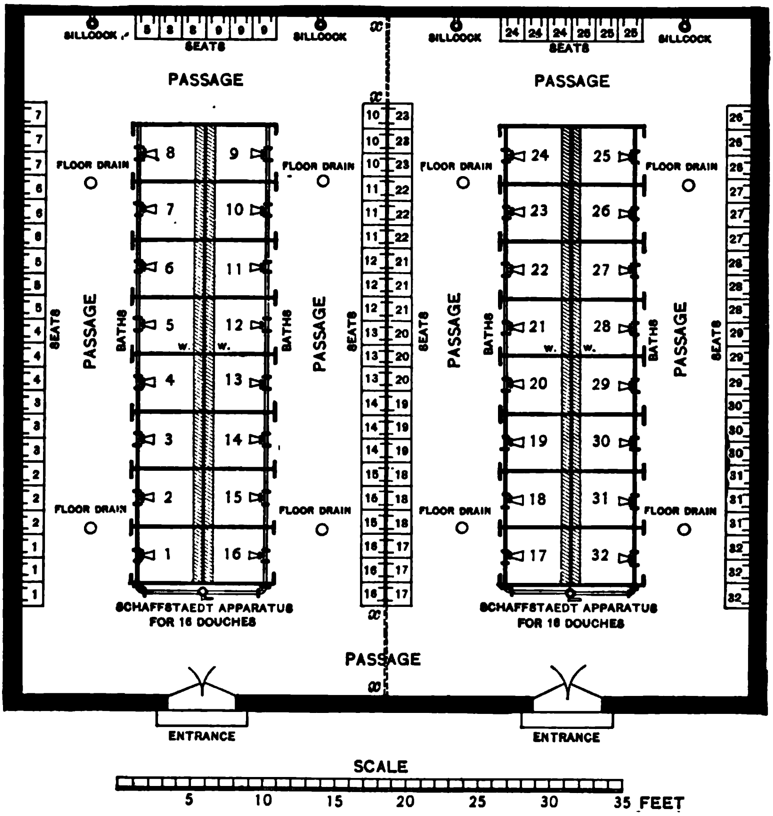
SILLCOCK
SEATS
SILLCOCK
SILLCOCK
SEATS
SILLCOCK
PASSAGE
PASSAGE
FLOOR DRAIN
SEATS
PASSAGE
BATHS
W.
W.
BATHS
PASSAGE
SEATS
SEATS
PASSAGE
BATHS
W.
W.
BATHS
PASSAGE
SEATS
SCHAFFSTAEDT APPARATUS FOR 16 DOUCHES
SCHAFFSTAEDT APPARATUS FOR 16 DOUCHES
PASSAGE
ENTRANCE
ENTRANCE
SCALE
5 10 15 20 25 30 35 FEET

Fig. 74. Authors' Plan of Proposed Bath House for Military Barracks.

number corresponding to one of the bathing units. Such an arrangement enables the quick bathing of a large number of soldiers or prisoners in the following way. The first 32 men undress and go to occupy the 32 bath compartments, and while they bathe under the sprays the second set of 32 men occupy the second set of 32 seats. Now the first set of men leave the baths in order to dress, while the second set of 32 persons take their place in the baths; and while they in turn bathe, a third set of men occupy the third set of seats to undress and get ready for the bath. As soon as the second set leaves the baths to dress, the third set takes their place, while the first set leaves the bath house, and a fourth squad of 32 people may get in readiness for the bath.

Allowing twenty minutes for the bath, the capacity of this bath house is 3 × 32 = 96 baths per hour, or 96 × 10 = 960 baths per day. The size of the bath house as shown is about 50 feet square, but it may be modified to suit local conditions.

The showers are supplied from two large Gegenstrom apparatus, each supplying 16 sprays, and each being operated by a bath attendant.

Each bath compartment is planned to be 4 feet by 5 feet; it may be separated from the corridors, if privacy is desired, by means of a plain, white, duck bath curtain, hung in front of the compartment, but as a rule the curtain is unnecessary, and in certain cases it may be objectionable. The floor of each bath compartment is pitched to a gutter, as shown, with perforated cover. The level of the corridors is slightly raised to prevent its becoming wet by the spray when a bath is taken.

The lines (x x) indicate how a bath house arranged on this system, but only half as large, may be planned. The plan, slightly modified, is also applicable to school baths.

Fig. 75 illustrates the general arrangement of the baths at the Kings County penitentiary in Brooklyn, N.Y. This bath house is said to be one of the finest of its kind in any penal institution in New York State. The baths are fitted up with the Gegenstrom system. The water can be regulated by the attendants to any

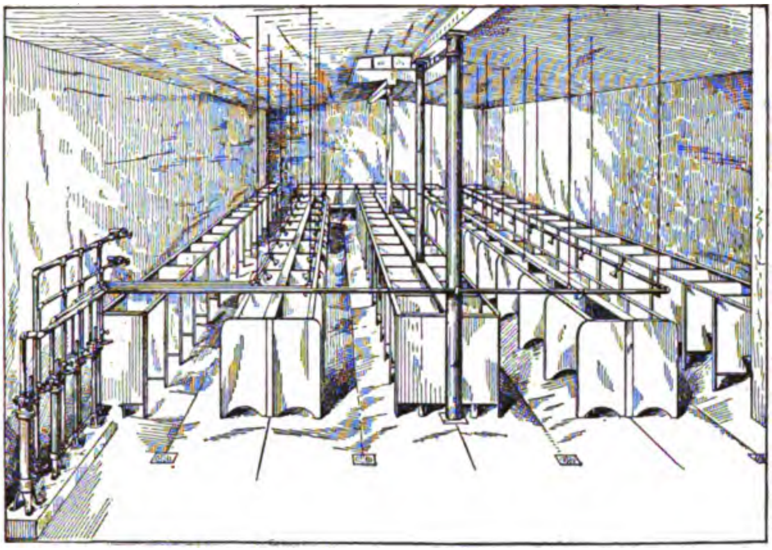

FIG. 75. VIEW OF SPRAY BATHS IN KINGS COUNTY PRISON, BROOKLYN.

temperature desired and forty men can bathe at one time. There are 40 sprays in alberene stone compartments, and 80 wooden dressing booths are provided for the men to undress and dress in. In this way a large number of men can bathe in a short time and have a continuous supply of clean tepid water. Similar baths exist at the Erie County prison in Buffalo, N.Y.

CHAPTER XII

HOSPITAL BATHS

HOSPITAL trustees or managers can do much to further bathing habits by providing ample and proper bathing facilities. In hospitals we find several forms of baths in use, such as the fixed and the portable bathtubs, the latter being placed on rollers or wheels; also showers, sudorific and hydrotherapeutic baths, electric and carbonic acid gas baths, so-called "permanent water baths," and others. For the baths mentioned a special bath house is usually provided, at least in the hospitals of European cities. Some modern German hospitals, recently visited and inspected by the writer, like those at Hamburg-Eppendorf, the Beelitz Sanitarium near Berlin, the municipal hospital at Nuremberg and the Elizabeth Hospital of Aix-la-Chapelle, offer fine examples of complete modern bath-house installations.

Tub baths are an expensive form of bath, and, moreover, they require a great deal of space, for the tubs in hospital wards must stand entirely free on the floor of the room, so that the nurse or attendant can reach the patient from all sides, but in general hospitals they are necessary and must be provided.

For that particular class of hospitals where the various forms of insanity are treated, *i.e.*, in cases where the brain only is diseased, while the body may be in a healthy state, the rain bath offers many advantages. This view of the writer is confirmed by the opinions of medical hospital superintendents. Soon after the completion of several of the earlier rain baths in New York City, I published a monograph on "Rain Baths," in which I described these baths. At the special request of the president of the New York State Lunacy Commission, I sent this pamphlet to the superintendents of all the State hospitals in New York State. In a circular of inquiry, sent out somewhat later by the New York State Commission in Lunacy to the State hospitals for insane, the question was propounded: "Have you a spray bath in operation, and do you regard that method of bathing patients with favor?"

It is interesting to read the replies received, which were, on the whole, highly favorable to the new method of bathing.

The superintendent of the Utica State Hospital replied: "I am disposed to regard with favor the method of bathing patients by means of a spray. It is in successful operation in three wards at present, and will be extended with the extension of facilities therefor."

The superintendent of the Buffalo State Hospital replied: "We have no spray bath in use, but are putting one in. I think it can be used with success with a certain class of patients."

The superintendent of the Willard State Hospital replied: "We have a spray bath in operation and regard it with much favor."

The superintendent of the St. Lawrence State Hospital replied: "We have no spray bath in operation in the wards. I should not consider the use of a spray desirable except in a general bathing house under the direction of an independent and responsible man."

The superintendent of the Rochester State Hospital stated: "The spray bath is in use in the male department. It is my opinion that it is the best method for bathing a large proportion of patients."

The superintendent of the Matteawan State Asylum for Insane Criminals stated: "In the case of filthy patients who require frequent bathing, and where numbers of them are associated together, I should regard this method of bathing with great favor. I should consider, also, that it might be used in bathing troublesome patients, who might be injured in struggles to place them in a bathtub."

The superintendent of the Willard State Hospital later on wrote: "Two spray baths have been in use for several months past, one at the infirmary for men, and one at the infirmary for women. In both buildings their use has been attended by the most gratifying success. In my opinion the 'spray bath' has four distinct and important advantages over the ordinary tub, viz.:

"(1) It is absolutely safe. There is no possibility of scalding a patient, and the more remote danger of suicide in a bathtub is also overcome.

"(2) Cleanliness is assured and the temptation offered to lazy attendants to bathe more than one patient in the same water is removed.

"(3) A great amount of time is saved, which under the old method is used in filling and emptying the tub. Our experience has been that one spray will do the work of two tubs in a little more than half the time.

"(4) There is much less hot water used, and there is a consequent reduction in the amount of coal consumed. While we have made no accurate experiments in this respect, my opinion is that the saving is considerable."

The superintendent of the Middletown State Hospital writes later on more fully as follows:

"I send herewith a statement concerning a new method of bathing, which has been inaugurated at this hospital, and which is known as the 'spray bath.' We refitted one of the bathrooms in the hospital annex as follows: A marble slab, about 5 feet long and 2½ feet wide, was laid near the center of the room. This slab was dished and countersunk, with a waste pipe in the center to carry off the waste water. The entire floor around the slab was laid with slate upon a cement bed. This slate was graded toward the center of the room in order that all waste would speedily pass away. The sides of the room were lined with marble slabs, 6 feet in height, carefully cemented together. This made a water-tight compartment, with a dished floor, thus securing perfect drainage. A pipe from the cold-water supply in the basement was brought to a mixer, and a hot-water pipe was brought from the hot-water tank. This mixer is supplied with valves to regulate the influx of either hot or cold water, and is also supplied with a thermometer to register the temperature after the water is mixed. From this mixer is carried a rubber hose about 6 feet long. At the end of the hose is a nickel-plated spray, which throws out a series of fine streams of water.

"The method of bathing patients is as follows: Some five or six patients are placed in a row upon the marble slab, which has been warmed by spraying it with hot water. Each patient is supplied with a cake of soap, and the attendant turns on the stream, having carefully observed that the temperature of the water is right. The temperature in the mixer will remain at about 100 degrees. It is probably 98½ degrees Fahr., or blood heat, when it reaches the surface of the person that is being bathed. One careful attendant can spray six patients at one time, and about five minutes are spent in spraying. After being thoroughly soaped, rubbed down and sprayed, each patient is furnished with a clean towel to dry himself. As soon as one set passes out of the bathroom another set passes in. Thus about 60 patients can be bathed in an hour, with pure and correctly tempered water in sufficient abundance.

"The advantages of this method are:

"(1) The dangers of scalding in a tub are avoided. Even if the water in the mixer should be quite hot, it inevitably cools to a certain extent before it can reach the body of the patient.

"(2) It furnishes clean water to each patient, and there is no opportunity for a lazy attendant to bathe three or four patients in the same tub of water.

"(3) The bath seems to be invigorating and exhilarating, and is greatly enjoyed by all the patients.

"This form of bathing furnishes not alone an opportunity for cleanliness, but as the water is applied with fine force over the entire surface of the human body, it stimulates to healthful action all the nerve extremities. It thus seems to invigorate the entire system. Thus far this method of bathing, which is new to this institution, is most satisfactory both to patients and attendants. By the old method of bathing only five or six patients could be bathed in one tub per hour. It was a slow and tedious process of drawing the water, of tempering it, of allowing the patient to bathe, and then drawing the soiled water from each tub and filling it again with fresh water. By the old method the attendant was obliged to endure a series of long and monotonous waitings, and thus he might in time quite naturally become careless and inattentive to duty. But the new method compels the close attention of the attendant while he works, but his task is soon and satisfactorily completed."

From the above extracts, quoted from the Third Annual Report of the New York State Commission in Lunacy, it will be seen that the opinions of medical men are highly favorable to this new method of bathing patients. It should be noted that most of the experiments were made with hand sprays, but to all practical purposes the inclined spray of the German rain bath is identical in action with the hand spray.

In August, 1893, Dr. G. Alder Blumer, then medical superintendent of the Utica State Hospital, requested the writer to visit the hospital, with a view of preparing a report, preliminary plans, and estimates of cost for the fitting up of a congregate bath house with rain baths for the patients. The general scheme submitted by me was approved by the hospital managers and a contract let in September of the same year. In August, 1894, the bath house was completed and put in use. Tests of the bathing apparatus used were made and proved the work to be in every way a success.

In the Fifty-second Annual Report of the managers of that institution it is stated that "the new bath house marks an epoch. . . . With this splendidly equipped spray bath (see Fig. 76, frontispiece) patients can be bathed with the utmost convenience, safety and dispatch. It is destined to become the accepted method of bathing the insane in public institutions." In the report of the medical superintendent, Dr. Blumer, the new bath house is thus described:

The crowning glory of the year has been the completion of the general bath house. For a detailed description of this structure the attention of the managers is called to the accompanying elaborate special report of Mr. Wm. Paul Gerhard, C.E., who planned the work and superintended its execution. Briefly stated, it is the so-called "rain bath," first popularized in Germany, which substitutes for the ordinary tubs a system of sprays which are supplied from specially constructed generators with warm water. To Dr. S. Baruch, of New York City, is due the credit of introducing the system into this country. His pamphlet, "A Plea for

Public Baths," published in 1891, was followed by the erection of a rain bath at the New York Juvenile Asylum. Others on a larger scale followed, some of which were planned and designed by Mr. Gerhard, who scattered much good seed through the medium of his pamphlets on "The Modern Rain Bath." The new system secured the immediate indorsement and encouragement of the State Commission in Lunacy. A copy of one of Mr. Gerhard's pamphlets fell into my hands and led to the engagement of the author's services at Utica. Our splendidly equipped bath is the result of that engagement. No one who has not had the opportunity to compare practically the old with the new method can form an adequate idea of the comfort and convenience of the rain bath adapted to the needs of a large hospital for the insane. All ward bathing is now a thing of the past, only to be sanctioned in special cases. In a word, *the rain bath is an ideal method of ablution.*

At the request of Dr. Henry M. Hurd, Secretary of the American Medico-Psychological Association, I prepared in 1895 a paper dealing with the rain bath and its advantages for hospitals for insane and public institutions generally. Many reprints of this paper were distributed to hospital superintendents and to architects in all parts of the United States. In this paper the Utica bath house is described and illustrated, and as it is of interest generally I reprint large portions of it herewith.

THE RAIN BATH — A NOVEL FORM OF BATH AND NEW METHOD OF BATHING INSANE PATIENTS

It would be superfluous on my part to attempt to dwell, by way of introduction, upon the necessity of absolute cleanliness in institutions where large numbers of patients, ill in body or in mind, or both, are cared for.

The requirement of cleanliness is not confined to the buildings and their surroundings, to the air, water and food supply, and to the maintenance of purity of the soil, but it applies likewise, and even in a higher degree, to *bodily cleanliness.* Therefore no provision is of more importance for institutions than that of proper bathing facilities for the patients. Heretofore this object has been attained by the fitting up of bathtubs in bathrooms attached to the wards of a hospital. The method of bathing patients in bathtubs has not, however, been altogether satisfactory.

Among the more important objections to bathtubs for institutions, I would mention the following:

1. Zinc and copper bathtubs do not last long, become dented, wear out soon, and lose their bright and cleanly appearance. Enameled iron bathtubs, unless very carefully used, are apt to have the enamel coating crack or chip off. Galvanized iron tubs have a rough surface and a dirty appearance. White all-porcelain bathtubs are very heavy, clumsy and quite expensive, and require large quantities of hot water.

2. The maintenance of bathtubs and bath fittings is expensive. Tubs also require much space, and much time is lost in filling them, in tempering the water, in bathing the patients, and after each bath additional time is required for emptying, cleansing and scrubbing the tubs. Consequently they do not accomplish the quick bathing of a large number of patients.

3. Unclean patients, taking a bath in a tub, are soon immersed in soiled water, and the absolute cleaning of the body would be difficult without emptying and refilling the tub several times for each bather.

4. The bathing of patients in tubs has occasionally a debilitating instead of a stimulating effect.

5. Tub baths require very large quantities of bathing water, and a proportionately large amount of hot water.

6. There is a possibility of skin diseases being transmitted from one patient to another. With troublesome patients it may, at times, require struggles on the part of the attendants to place them in a bathtub, and these struggles may lead to bodily injury.

7. The danger of scalding patients in a bathtub, and the possibility of suicide of insane by drowning, render the bathtub undesirable in public institutions.

8. With bathtubs lazy attendants have an opportunity of bathing several patients in succession in the same water, the patient thus failing to receive clean water for his ablution.

In the modern rain-bath system, tubs are entirely discarded, and simple shower or spray baths take their place, the spray being installed as a distinct and independent form of bath.

The rain bath, particularly as a form of public bath, had its origin in Germany, one of its chief advocates being Prof. Dr. Oscar Lassar. The Berlin Health Exhibition of 1883 gave an opportunity to introduce this form of the rain bath to the general public, though long before this exhibition rain baths had been fitted up in prisons and in military barracks in France as well as in Germany.

In the United States the rain bath was brought to the notice of the engineering profession in descriptions which appeared in the *Engineering Record* (then the *Sanitary Engineer*); it was recommended for military posts in a circular, issued in 1875, by John S. Billings, assistant surgeon, U.S.A., and was again brought to the notice of the medical profession in an article on "Recent Advances in State Medicine," by Dr. George H. Rohé of Baltimore, published July 2, 1887, in the Journal of the American Medical Association. It was not, however, until the year 1889 that rain baths attracted a more general attention. Dr. S. Baruch, a hydrotherapeutic physician of New York City, who had an opportunity of visiting and inspecting some of the European baths built on the new principle, published an editorial in the Philadelphia *Medical Times* of Aug. 24, 1889, dealing with the subject.

Leaving out of consideration a small bath house built at Manistee, Mich., on the rain-bath principle, referred to in Dr. Rohé's paper, about which the details are meager, the first American rain bath to attract some attention was installed at Dr. Baruch's suggestion, in December, 1890, at the New York City Juvenile Asylum. Dr. S. Baruch continued to urge the importance of bathing and the need of people's baths, and, partly as a result of his agitation, several rain baths were installed in 1891 in New York City. The erection of similar baths soon followed in other cities. Hospital superintendents and the members of the New York State Lunacy Commission became much interested in the subject, the latter urging the adoption of the novel method in the State hospitals, in which several experimental spray baths were fitted up. Mr. Goodwin Brown, of the same Commission, became much interested in public baths, and in particular the rain bath, and to him belongs the credit of having had a bill introduced and passed in the Assembly at Albany, giving cities and towns the authority to build public baths.* I might add that the opinions of medical men who have investigated the rain bath are highly favorable to the new method of bathing, and many superintendents of hospitals do not hesitate to pronounce it the best method of bathing a large proportion of the patients.

In August, 1894, the first large bath house fitted up entirely with rain baths was completed at the Utica State Hospital. Before giving a description of the same, I will briefly discuss the form and the advantages of rain baths.

A distinctly novel feature of construction in the rain bath is the inclination at which the overhead shower is placed, the object being to avoid a vertical stream from it striking the head of the bather. In the rain bath the lukewarm water strikes the body from the neck downward, and the head is kept dry, except when the bather purposely places the same under the shower.

In the experimental baths fitted up in some of the New York State hospitals a hand sprinkler, or spray, attached to a rubber tube was used instead of an overhead fixed shower. For all practical purposes the inclined spray of the German rain bath is identical with the hand spray, but the latter requires, in all cases, the services of an attendant for each patient, whereas many patients in hospitals are able to bathe and perform their ablutions under the overhead inclined spray without assistance. The general use of the hand spray would also appear to me to be objectionable, because it might tend to give to the public, not acquainted with the management of modern hospitals for the insane, the impression that patients are at times sprayed by the attendants against their wish.

Regarding the many advantages of the rain bath I will only enumerate the following:

1. The construction of rain baths is cheaper than that of bathrooms fitted with bathtubs. The running expenses for

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* Note. — Since the above was written, the Governor of the State of New York has signed a bill making it mandatory upon all cities in the State having 50,000 or more inhabitants to build and maintain a sufficient number of free baths.

maintenance and repairs are likewise reduced, because the apparatus is simple and not liable to get out of order, and because the sprays last longer than the tubs.

2. The rain bath is always ready for use and requires very little attendance, hence it is economical in management. No time is lost in filling the tubs, tempering the water, and in emptying, cleansing and scrubbing the tub after each bath.

3. The rain bath requires much less time in application, and a larger number of patients can be bathed in this system than in bathtubs.

4. The rain bath requires less space in the planning of a bath house than bathtubs do. More bathers can, accordingly, be accommodated in a given space.

5. *The body of a person using a rain bath does not come at all in contact with the soiled water*, the water from the spray passing away through the outlet in the floor as fast as delivered. This should be considered the leading advantage of rain baths.

6. The descending stream of the rain bath has a mechanical and tonic effect, and its stimulating and invigorating influence is much higher than that of a bath taken in a tub.

7. The rain bath requires considerably less water than a tub bath. It is economical in the requirement of hot water, and hence reduces the expense for fuel.

8. In the rain bath there is less danger of communicating disease; there is no danger at all of patients being scalded or receiving bruises in struggles to place them in the bathtub, and the patients are always sure to be bathed in clean water, while the opportunity of committing suicide, as in a bathtub, is entirely removed.

In Europe, rain baths have been eminently successful, and in this country they are rapidly becoming popular. The advantages are so obvious that I feel confident in predicting an early and successful development of the new form of bath.

The following is a condensed illustrated description of the bath house at the Utica State Hospital.*

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* See the author's pamphlet on "The Rain Bath at the Utica State Hospital" (now out of print).

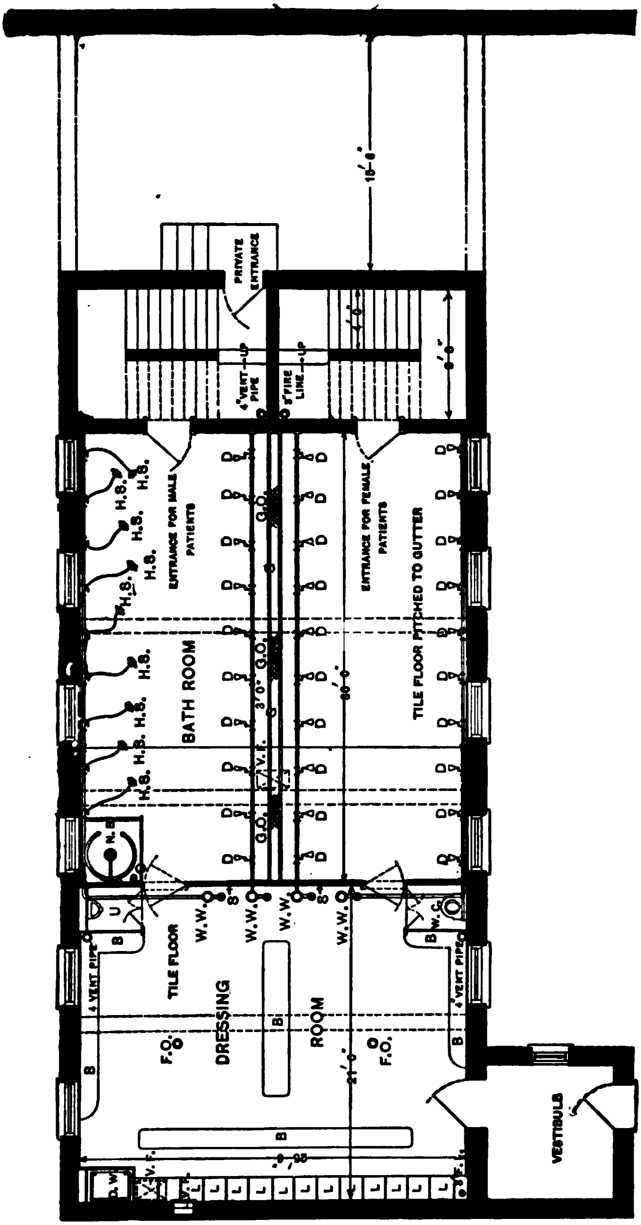
15'-6"
PRIVATE ENTRANCE
4'-0"
8'-0"
4" VENT PIPE
UP
5" FIRE LINE
UP
ENTRANCE FOR MALE PATIENTS
ENTRANCE FOR FEMALE PATIENTS
TILE FLOOR PITCHED TO GUTTER
BATH ROOM
H.S.
G.O.
D
3'0"
V.F.
30'-0"
N.B.
W.W.
S
U
B
W.C.
4" VENT PIPE
TILE FLOOR
DRESSING ROOM
F.O.
B
21'-0"
VESTIBULE
V.F.
L
D.W.

FIG. 77. PLAN OF BATH HOUSE AT UTICA STATE HOSPITAL.

The bath house is centrally located in the rear of the large open court or quadrangle, between the amusement hall and the boiler house. It can be reached from the male and female wards without the necessity of compelling the patients to go out of doors, a consideration of much importance for the bathing in winter time. The general plan and arrangement of the bath house is shown in Fig. 77.

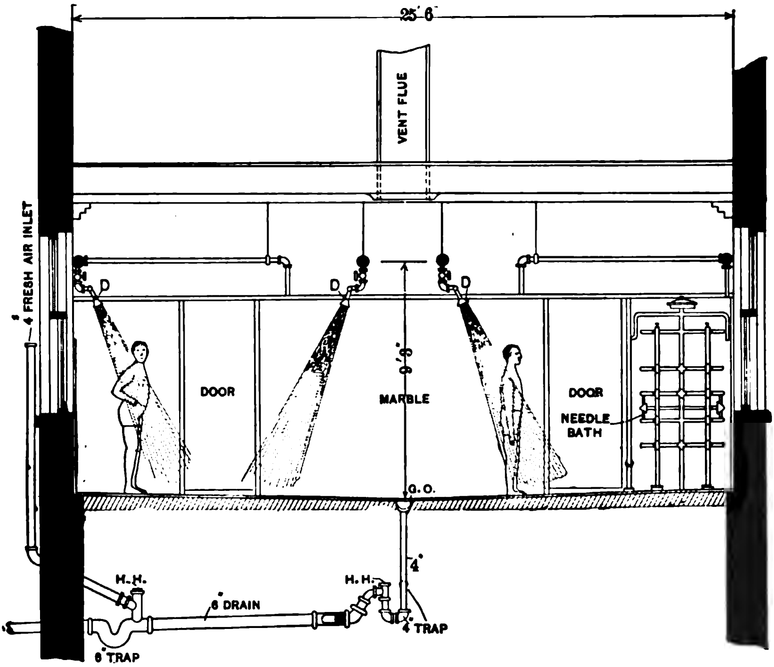
25'6"
VENT FLUE
4" FRESH AIR INLET
D
D
D
D
DOOR
8'-8"
MARBLE
DOOR
NEEDLE BATH
G.O.
4"
H.H.
6" DRAIN
H.H.
4" TRAP
6" TRAP

FIG. 78. CROSS SECTION OF BATH HOUSE, SHOWING ARRANGEMENT OF SPRAYS.

The bathroom proper is 30 feet long and 25 feet and 6 inches wide; the adjoining dressing room is 21 feet long and 25½ feet wide. There are separate entrances, stairs and vestibules for he men and women patients.

The bathroom proper, as shown in cross-section in Fig. 78 and n view in Figs. 76 and 79, contains four rows of overhead sprays

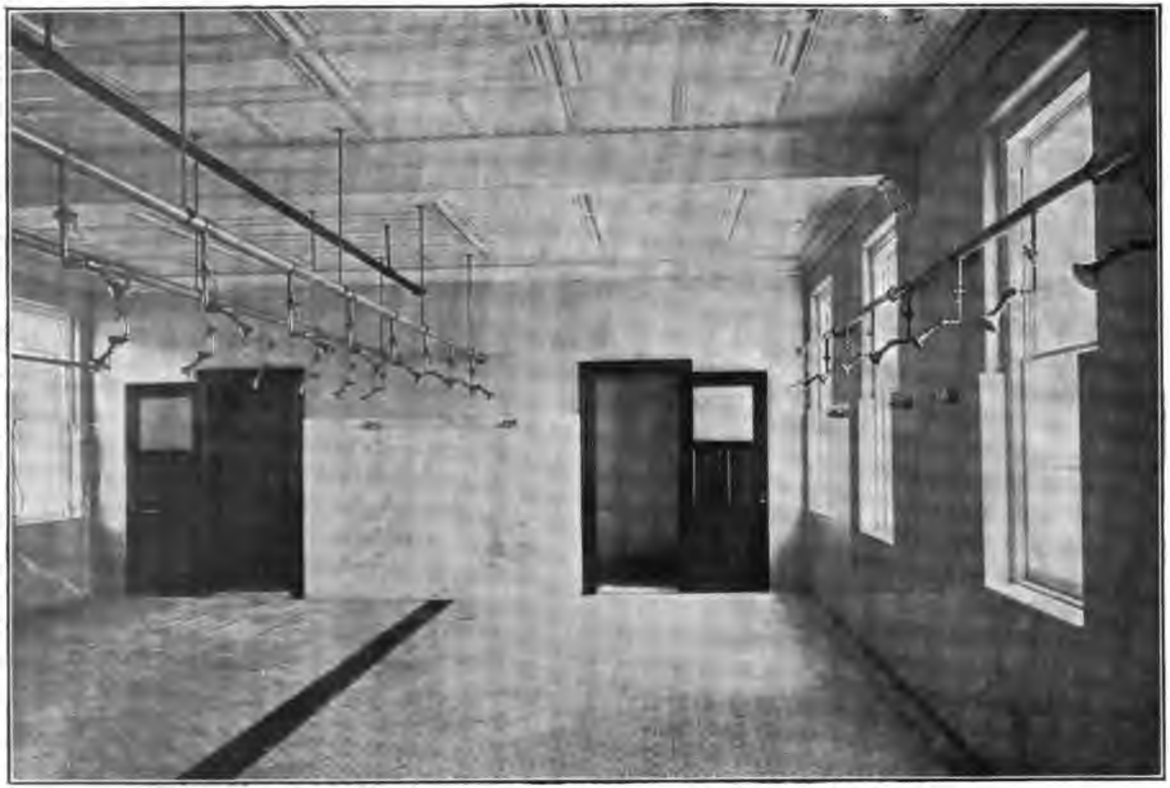

FIG. 79. ANOTHER VIEW OF INTERIOR OF BATH HOUSE AT THE UTICA STATE HOSPITAL, LOOKING IN AN OPPOSITE DIRECTION FROM VIEW FIG. 76.

and hand sprinklers. In the center of the bathroom a gutter is arranged for the removal of the bath waste water, the floor on both sides of the gutter being properly pitched to allow the water to run off freely. Four lines of warm-water supply pipes are carried at a height of about eight feet above the floor, the two inner lines being suspended from the ceiling, and the outer two attached to the side walls. Three of these lines supply ten inclined sprays each (thirty in all), while the fourth line supplies a needle bath and nine hand sprays. The bathroom contains eight large windows, and is thus amply lighted.

The dressing room, shown in cross-section in Fig. 85, contains, on the side nearest to the bathroom, the four warm-water apparatus (see Fig. 80), also a water-closet and a urinal. On the extreme wall of the bath house are placed forty-two open clothes boxes, arranged in three tiers of fourteen boxes each. There is also in one corner of the room a clothes dumb-waiter. Benches of hardwood are placed around the free sides of the room, and two long benches stand in the center. The dressing room contains three windows. The laundry being at the extreme end of the bath house, it was decided to place the dressing room immediately adjoining the laundry. But for this fact it would have been preferable to reverse the location of the bath and the dressing room in the plan, placing the latter nearest to the wards.

The space under the bath and dressing rooms was excavated to a depth of five feet. The main floor was constructed of brick arches and I-beams, supported on brick piers. A concrete foundation was placed on top of the brick arches, its upper surface being graded to the central gutter. The floor of the dressing room is pitched slightly to two floor outlets. The floor of dressing room, bathroom and of vestibules was finished with American unglazed embossed white and pearl gray "Alhambra" tiles, 6 inches square, with a tile border.

The walls of the bathroom are wainscoted with white Italian marble to a height of 6 feet from the floor. The partition dividing the bathroom and the dressing room is of marble, 1½ inches thick and 7½ feet in height. The water-closet and the urinal

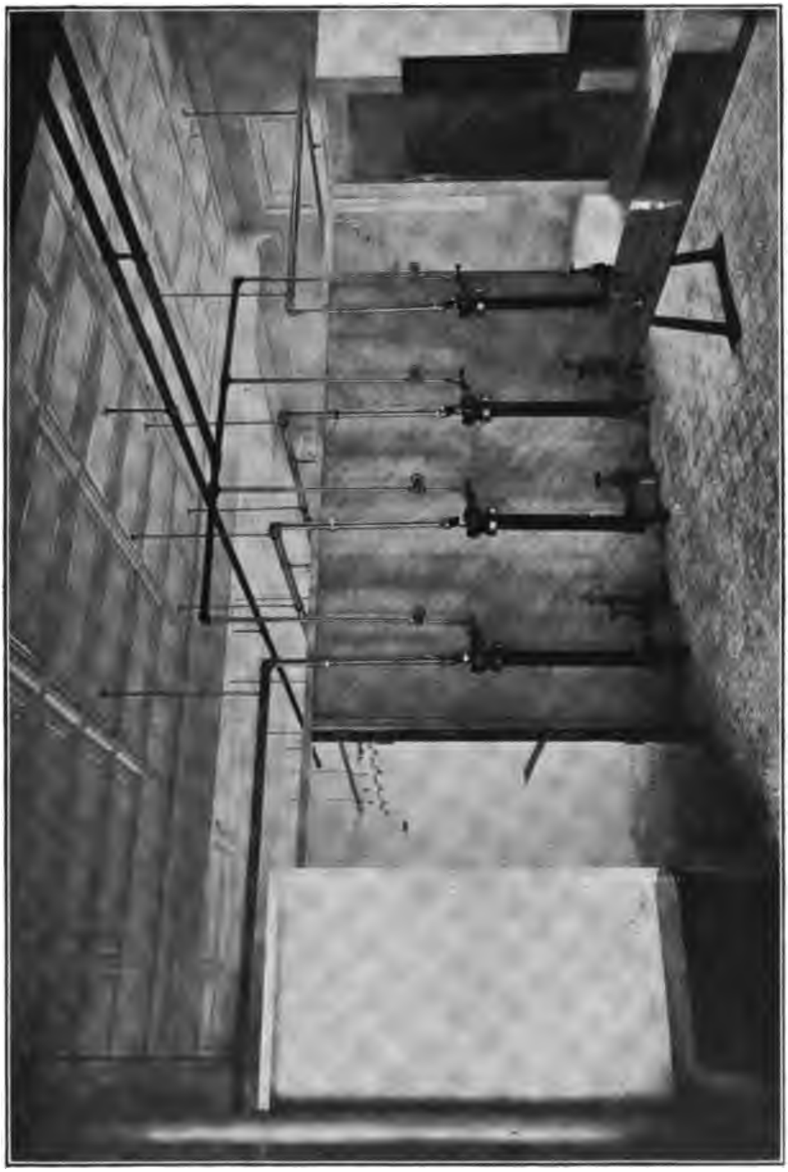

FIG. 80. INTERIOR VIEW OF BATH HOUSE AT UTICA STATE HOSPITAL, SHOWING THE HOT WATER APPARATUS FOR THE SPRAYS.

are also enclosed by marble partitions. The walls of the dressing room are wainscoted in ash to a height of 6 feet. All woodwork in this room, including the benches, lockers and the flap doors, is of ash. The ceiling of bath and dressing rooms is finished with paneled stamped steel sheets, painted with ivory color special bath enamel paint.

The floor gutter in the bathroom is 9½ inches wide at the top, 6 inches wide at the bottom, and about 6 inches deep. (See detail section, Fig. 81.) It was molded in concrete and has three outlets to which the gutter is pitched. Each outlet is covered in the bottom of the gutter with a 5-inch nickel-plated brass bar strainer, and is connected with a 4-inch waste pipe, trapped by an iron trap with a deep water seal. The gutter proper is covered with sectional perforated gratings of cast brass, laid flush with the tiled floor. The two floor outlets in the dressing room, which are only used when the floor is flushed with a hose, consist of brass cesspools with shut-off valves (like Fig. 82), trapped by 3-inch iron traps.

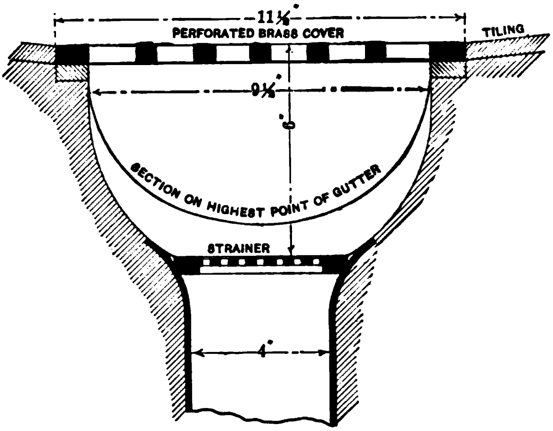

Fig. 81. Detail of Floor Gutter.

The sewerage of the bath house is arranged substantially as follows: from the outside main sewer in the court a 6-inch branch sewer runs into the bath house. This extra-heavy cast-iron drain pipe has a 6-inch main trap, accessible in the space under the bathroom, and a 4-inch fresh-air pipe. From the 6-inch main are branched off the several sub-mains to the floor outlets, and to the plumbing fixtures. The branch for each gutter outlet is 4 inches, the sub-main for these is 5 inches, while another 5-inch sub-main receives a 4-inch branch from the water-closet, and 3-inch branches from the floor cesspools, the urinal and the waste outlet from the needle bath. All ~~outlets have traps provided~~ with brass clean-outs. The drains are freely ventilated by means of 4-inch galvanized wrought-iron ventilating pipes carried above the roof of the bath house. All cast-iron pipes are put together with lead-calked joints, and the entire drainage system was tested by filling the pipes with water.

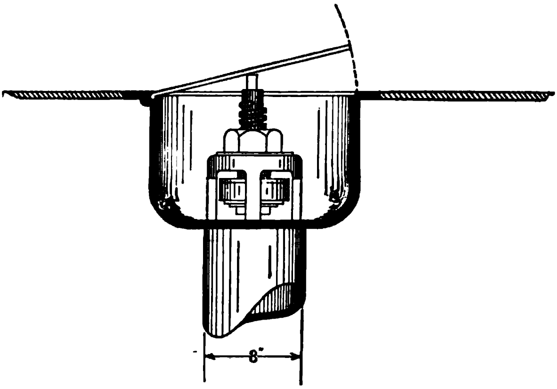

FIG. 82. DETAIL OF FLOOR DRAIN.

The bathroom is fitted up with thirty overhead nickel-plated brass stationary sprays, standing inclined, and with nine hand sprays. These latter are placed on the wall where the needle bath stands, and are intended for patients who require the assistance of attendants in bathing. The sprays first obtained were designed to run seven and one-half gallons per minute (under twenty-five pounds water pressure). The warm-water apparatus, obtained from Germany, was designed to run but two and one-half gallons, and with the same were sent special sprays (see Fig. 83), with much finer holes, giving a very effective and pleasant spray, at the same time being less wasteful of water. The sprays stand inclined at such an angle that the water strikes the bather from the neck downward. The swivel joint (Fig. 84) was made specially for this work.

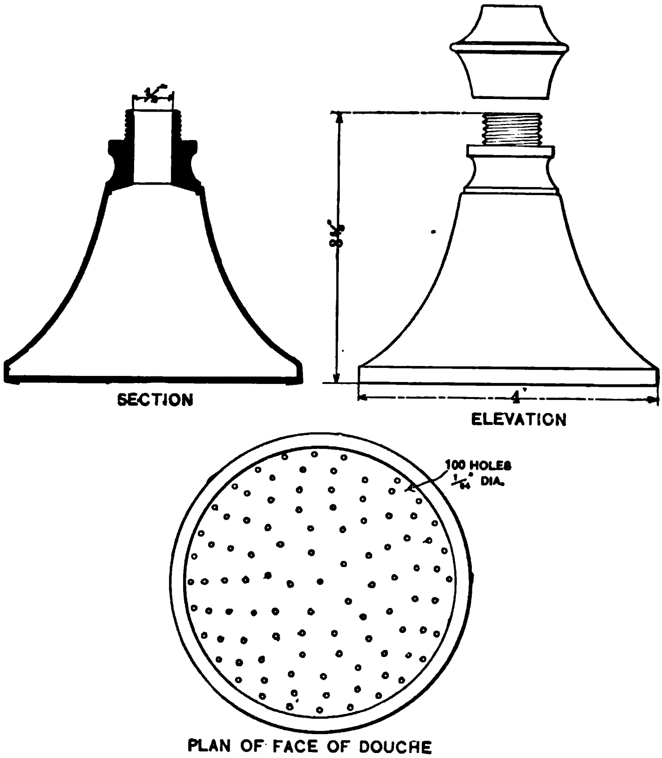

Fig. 83. Detail of Sprays.

The single needle bath is a combination needle, shower, liver spray, and bidet-jet bath, intended for special use. It has a large open plated brass floor strainer, and is enclosed with marble partitions 6 feet high. In front there is a white rubber curtain hung from a nickel-plated brass pole. The toilet fixtures require no special description. In the dressing room two ¾-inch plated sill-cocks are provided for hose connection, to enable the attendants to wash the floor of the room, the waste water passing out through

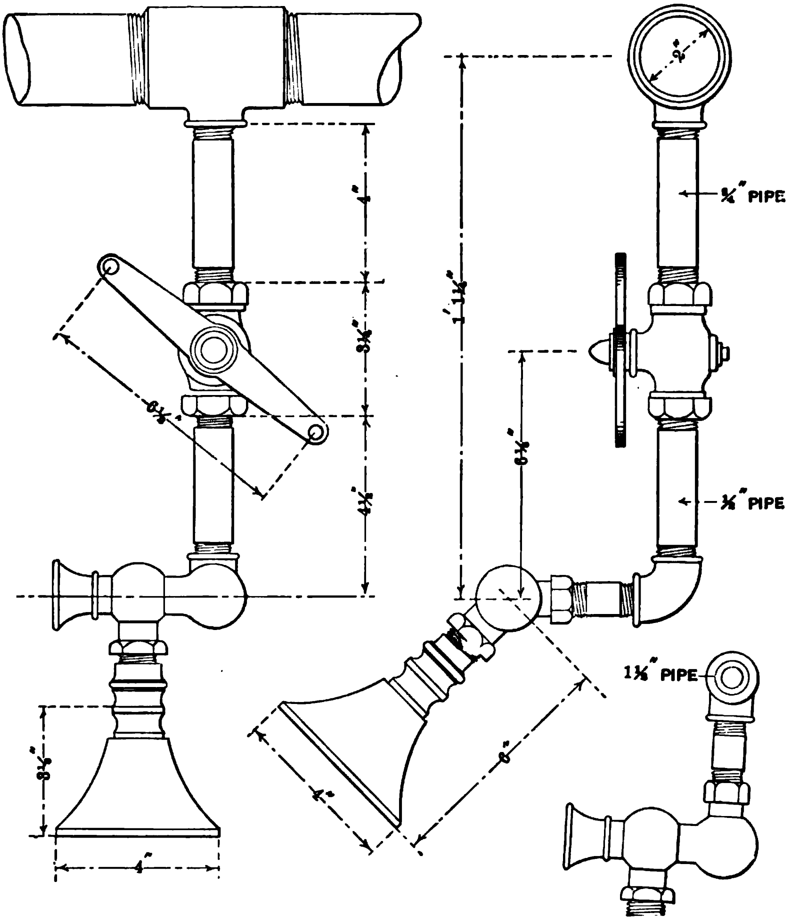

FIG. 84. DETAIL OF SWIVEL FOR SPRAYS.

the two brass floor cesspools. There are also provided two lines of 3-inch fire standpipes with outlets for fire valves on second floor, in the staircase and in the clothes assorting room. The fire valves are 2½ inches in diameter and have 50 feet of unlined linen fire hose attached, supported in swinging hose racks.

The dressing room is provided with sufficient benches to accommodate forty patients. Cork mats were laid on the floor of the dressing room to keep the floor dry and the bathers' feet warm. In the bathroom a long bench was placed in the center of the room to enable the bathers to sit down while washing their feet.

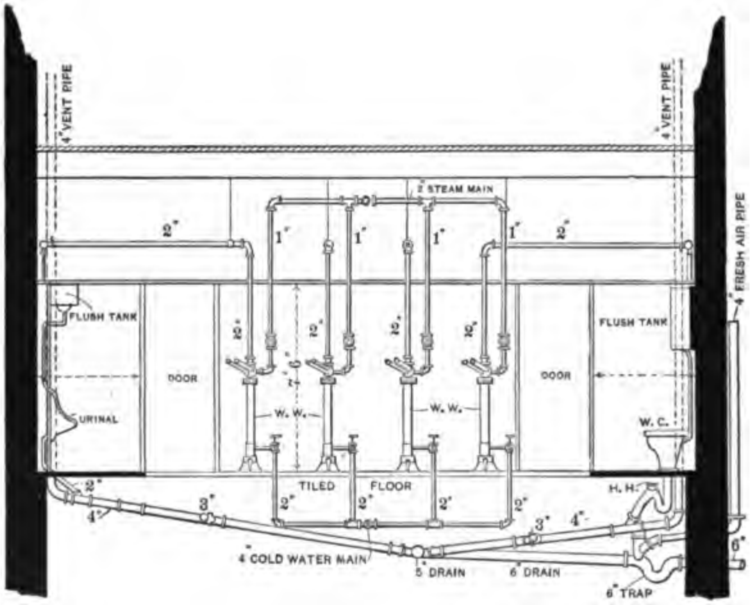
4" VENT PIPE
4" VENT PIPE
4" FRESH AIR PIPE
2" STEAM MAIN
2"
1"
1"
1"
1"
2"
FLUSH TANK
FLUSH TANK
DOOR
DOOR
URINAL
W. W.
W. W.
W. C.
2"
2"
2"
2"
TILED FLOOR
2"
3"
4"
2"
2"
2"
2"
H. H.
3"
4"
6"
4" COLD WATER MAIN
5" DRAIN
6" DRAIN
6" TRAP

Fig. 85. Cross-Section of Bath House, Showing Arrangement of Hot Water Apparatus.

All piping in the bathroom and at the warm-water apparatus is of tinned and annealed brass pipe. The sizes of supply pipes are as follows: the water main to the bath house is a 4-inch pipe of galvanized wrought iron, with 3-inch branches to each fire standpipe, and with 2-inch branches to each of the four warm-water apparatus, controlled by valves (see Fig. 85). The sill-cocks are supplied by ¾-inch pipes, the flush tanks of the urinal and water-closet by ½-inch pipes. The four warm-water mains of brass are each 2 inches in diameter, with 2-inch by ¾-inch Tee branches; the piping to each spray is ¾ inch. The warm-water supply to the needle bath is one inch.

The steam supply pipe to the warm-water apparatus is a 2-inch high-pressure main (with 60 pounds steam pressure), having 1-inch branches to each apparatus, controlled by globe valves. The return pipe for condensed steam from each apparatus is ½ inch.

The bath and dressing rooms are heated from overhead steam pipes to avoid placing radiators where patients would be in danger of scalding themselves. Large steam mains pass through the excavation under the bath house, and the heat radiating from these pipes, which are not covered, is intended to impart warmth to the tiled floor, so as to prevent the bathers' feet from being chilled. The vestibule, stairs and connecting corridors, leading to the wards, are heated so as to prevent patients from catching cold when returning to the wards after the bath.

Ventilation of the bath house is accomplished by two large vent flues having registers at the ceiling of the dressing room and of the bathroom, which flues are extended upward through the roof. In daytime the bath house is amply lighted by the windows, which have panes of glass rendered opaque to secure privacy. The bath house is also wired for incandescent electric lamps suspended from the ceiling.

All general requirements of sanitation have been strictly observed in the arrangement and construction of the bath house. The sewerage is arranged with particular care. All outlets into the sewer system are safely trapped, the drains are amply ventilated and flushed by the large quantity of bath water, the water-closet and urinal are of the best available type for hospital use, and the whole plumbing system has been made tight and tested.

On account of its simplicity in construction and efficiency in action, the writer, with the approval of the medical superintendent, selected the Schaffstaedt "Gegenstrom" apparatus, and four heaters were accordingly imported from Germany. Each heater was designed and calculated to supply warm water of not to exceed 110° Fahr. for ten sprays, running each at the rate of 2½ gallons per minute under 25 pounds pressure. These Gegenstrom apparatus were the first apparatus of this kind used in the United States. Fig. 86 shows a front and side elevation of this apparatus. A is the inlet for cold water, B the inlet for steam, C the warm-water outlet pipe leading to the sprays, D the outlet pipe or return pipe for the condensed steam. E is the cold-water cock and F the steam cock. G is a hot-water thermometer graded to indicate up to 220° Fahr. The principal dimensions of the apparatus are figured in the illustrations and in the cross-section of the dressing room the complete piping of the warm-water apparatus is shown. So far as known to me this apparatus has worked well for many years.

Fig. 76 shows a view in the bathroom, looking towards the dressing room, with all the sprays running. It shows the gutter in the center of the tiled floor, covered by the brass sectional grating. In the right-hand corner of the picture is shown the needle bath. The marble partition at the end of the bathroom separates the bathroom from the dressing room. The view gives a very good idea of how the overhead piping was arranged and carried.

Fig. 79 is another view of the bathroom, looking toward the opposite side or to the entrances from the wards. In this case the sprays are not in operation.

Fig. 80 is a view of the dressing room, looking toward the marble dividing partition between the bath and dressing rooms. It shows the four Gegenstrom apparatus placed in position with their connecting piping. Through the open door are seen some of the inclined sprays in the bathroom. The view gives a very good idea of how the warm-water apparatus is fitted up. The four cold-water pipes pass up through the tiled floor to the right of each apparatus and are controlled by angle valves before entering at the bottom of the warm-water apparatus. The straight upward continuation of the apparatus represents the warm-water pipe, the two end ones turning to the right and left, while the two middle ones go out straight to the bathroom. The lower of the two

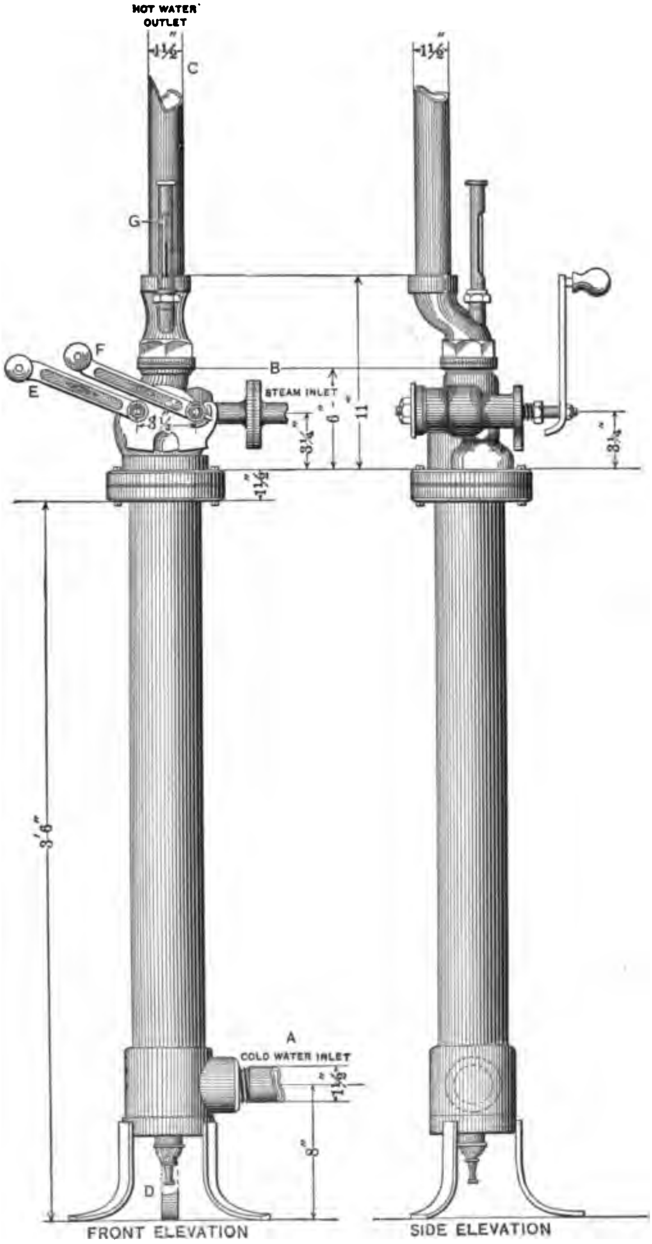
HOT WATER OUTLET
1½"
C
G
F
E
B
STEAM INLET
3½
6"
11
3¼"
1½"
3¼"
3'6"
A
COLD WATER INLET
1½"
8"
D
1½"
FRONT ELEVATION
SIDE ELEVATION

FIG. 86. DETAILS OF LARGE "GEGENSTROM" HOT WATER APPARATUS.

ceiling pipes is a high-pressure steam main, which has four overhead branches, dropping to each of the four apparatus. The valve which controls the steam supply is placed to the right of each apparatus as shown.

Allowing five minutes for undressing, fifteen minutes for soaping, spraying and drying, and ten minutes for dressing, each bath would occupy thirty minutes' time; hence, as there are thirty-nine sprays, seventy-eight patients can be bathed with comfort in one hour, or in five hours per day 390, or about 400 persons. The amount of water used for each bather would be in ten minutes about 25 gallons, or 25 × 78 = 1,950 gallons per hour, or 9,750 gallons in five hours for bathing 390 patients.

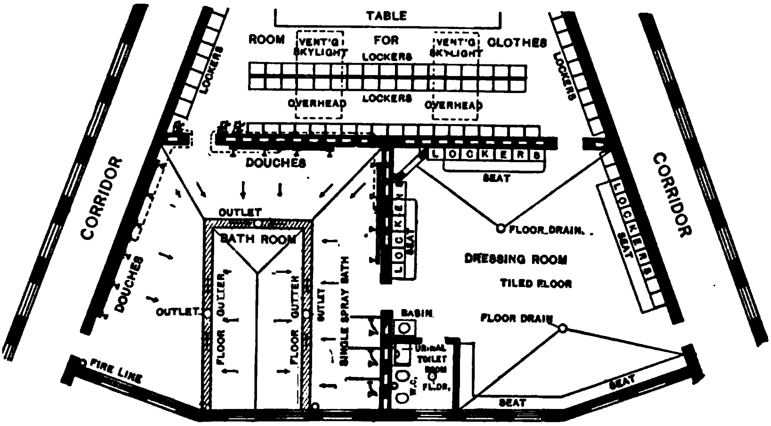
TABLE
ROOM
VENT'G SKYLIGHT
FOR
LOCKERS
VENT'G SKYLIGHT
CLOTHES
OVERHEAD
LOCKERS
OVERHEAD
LOCKERS
LOCKERS
CORRIDOR
CORRIDOR
DOUCHES
LOCKERS
SEAT
OUTLET
BATH ROOM
FLOOR DRAIN.
LOCKERS
SEAT
DRESSING ROOM
TILED FLOOR
LOCKERS
SEAT
DOUCHES
OUTLET
GUTTER
GUTTER
OUTLET
SINGLE SPRAY BATH
FLOOR
FLOOR
BASIN
FLOOR DRAIN
URINAL
TOILET ROOM
W.C.
FL.DR.
FIRE LINE
SEAT
SEAT

Fig. 87. Plan of Bath House at the King's Park State Hospital, L. I.

Fig. 87 shows the plan of another congregate bathroom, intended for the bathing of insane patients at the Long Island State Hospital at Kings Park, L.I. The general plans for the building were prepared by the State architect, while the author planned and laid out the bathroom and directed its installation and equipment from beginning to the finish.

The bath house is a centrally located structure which can be conveniently reached from all hospital wards. It is divided by a central wall into a large open dressing room, furnished with bench seats and lockers, and an irregularly shaped bathroom, with floor gutters and with fourteen overhead rain sprays and three hand sprays. There is a toilet room just off the dressing room, containing two water-closets and one urinal. I regret not being able to furnish any interior views of this successful bath house.

In the many years during which the author acted in the capacity of consulting sanitary engineer to the State architect, he superintended the installation of a number of other smaller spray bathrooms at the hospitals for insane located at Gowanda, Binghamton, Willard, Poughkeepsie and Middletown, N.Y.

All general hospitals should have a spray bath fitted up for the use of the firemen and the engineer in charge of the mechanical plant.

In disinfecting stations of European hospitals it is usual to provide a rain bath for the employees who work in this department.*

A plan for a hospital bath house, on the lines of the one adopted for the Utica hospital, but of smaller capacity and intended for the congregate bathing of twenty patients, is shown in Fig. 88. It may be said, incidentally, that this plan is equally suitable for a prison bath. The dressing room is kept separate from the bathroom and has no private dressing compartments, but if required it can easily be modified in this respect by the addition of a few partitions.

The dressing room measures about 20 by 25 feet, while the bathroom is a trifle larger, namely, 25 feet each way. The dressing room should have accommodations for forty patients, for in this way considerable time may be saved in bathing the patients; the first twenty may bathe while the second squad of twenty undress.

The sprays are of the usual type and are placed on three sides of the bathroom. A needle and shower bath is also provided.

The sprays are supplied with water of the right temperature

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* See the author's work, "Sanitation of Public Buildings," published in 1907 by John Wiley & Sons.

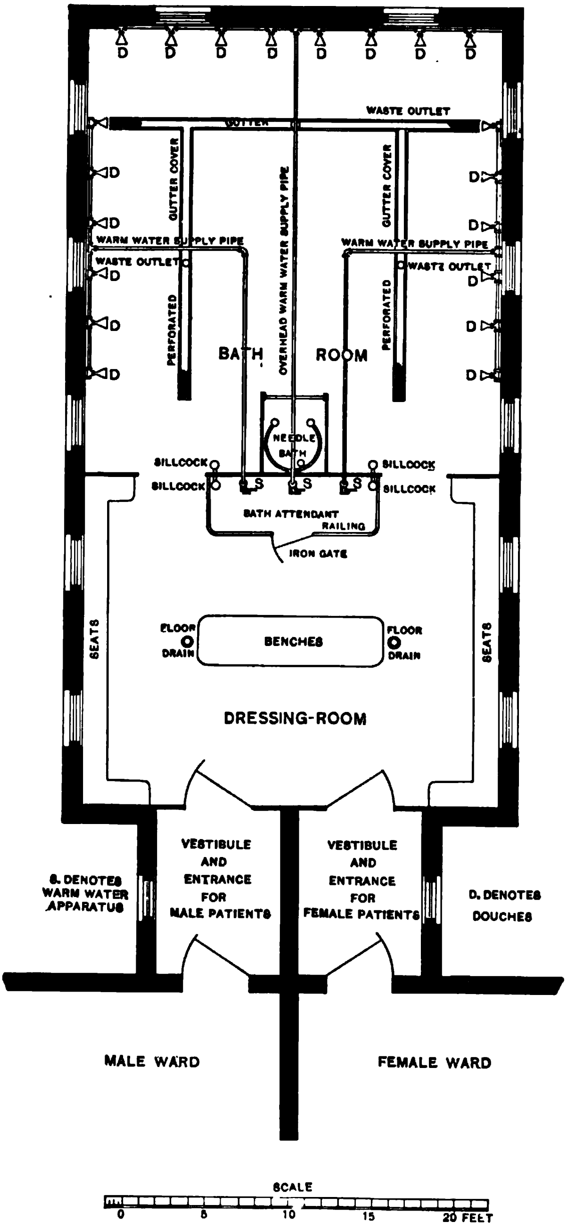
D D D D D D D D
WASTE OUTLET
GUTTER
GUTTER COVER
OVERHEAD WARM WATER SUPPLY PIPE
GUTTER COVER
D
D
D
D
WARM WATER SUPPLY PIPE
WARM WATER SUPPLY PIPE
WASTE OUTLET
WASTE OUTLET
D
D
D
D
D
D
PERFORATED
PERFORATED
BATH ROOM
NEEDLE BATH
SILLCOCK
SILLCOCK
SILLCOCK
SILLCOCK
S
S
S
BATH ATTENDANT
RAILING
IRON GATE
SEATS
SEATS
FLOOR DRAIN
BENCHES
FLOOR DRAIN
DRESSING-ROOM
VESTIBULE AND ENTRANCE FOR MALE PATIENTS
VESTIBULE AND ENTRANCE FOR FEMALE PATIENTS
S. DENOTES WARM WATER APPARATUS
D. DENOTES DOUCHES
MALE WARD
FEMALE WARD
SCALE
0
5
10
15
20 FEET

FIG. 88. AUTHOR'S PLAN FOR PROPOSED HOSPITAL BATH HOUSE.

for bathing by three Gegenstrom apparatus, which are to be operated by the attendants. The floors of both rooms are intended to be tiled and the walls lined with marble or faced with enamel brick. The waste water from the showers is removed to the sewer by means of the three gutters, which are covered with perforated covers. The capacity of such a bath house is sixty baths per hour, or 600 baths in ten hours. If each of the sprays runs for ten minutes, the water consumption would amount to 15,000 United States gallons of water of 110° Fahr. per day.

CHAPTER XIII

BATHS FOR CLUBHOUSES, GYMNASIUMS, HOTELS AND BARBER SHOPS

CLUBHOUSES are usually furnished with bathing facilities in the shape of bathtubs, which should always be provided with rain spray in the manner described in Chapter V, dealing with baths for private houses. Clubs devoted to athletic sports have, of course, a number of shower baths, and it is not unusual for them to have also provided a regular natatorium or plunge.

School gymnasia require, as an adjunct to bodily exercise and gymnastics, both a swimming pool and cold or tepid showers. Fig. 89 gives an interior view of the shower baths for boys at the East Boston Gymnasium.

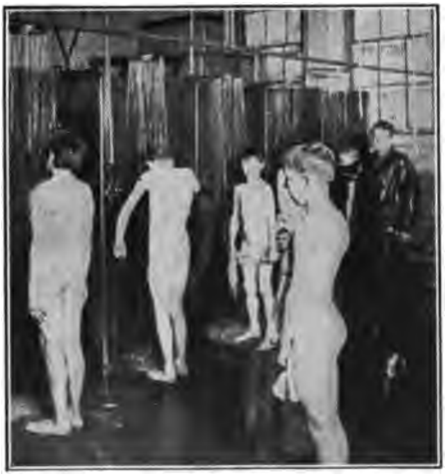

FIG. 89. VIEW OF SHOWER BATHS FOR BOYS' GYMNASIUM.

In the large American cities it is customary to provide in the principal hotels, as well as in the better class of barber shops, bathing facilities, these being intended to a large extent for the use of the traveling public. In the past, bathtubs of various materials and fittings have been fitted up and installed for this purpose. Inasmuch as the cleansing of the skin is the chief consideration and object of such baths, the new form of tepid rain or spray bath appears to me to be eminently well adapted for the purpose.

A plan of such a barber shop, fitted up with eight spray baths, is shown in Fig. 90. The details of each bath compartment would be substantially the same as those shown in Fig. 9. In the illustration it is assumed that the barber shop is located on a lot of irregular shape. Adjoining the barber shop proper is a commodious waiting room, fitted up with a reading table, chairs and bench seats for the customers who are obliged to

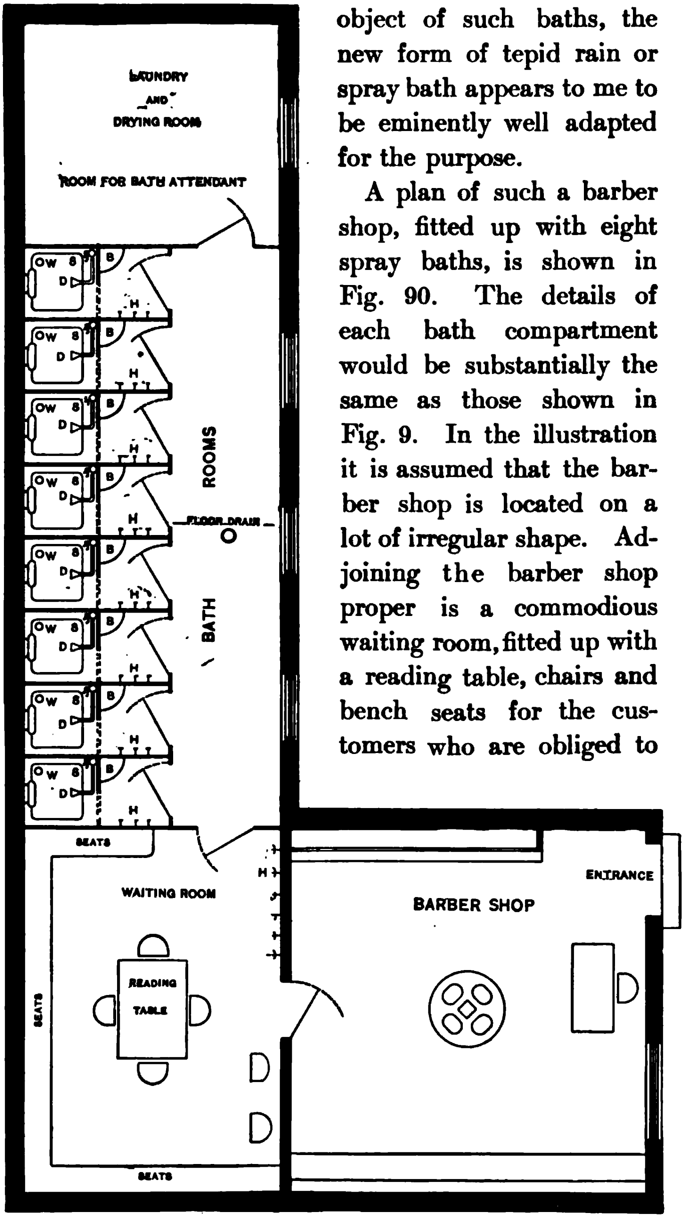
LAUNDRY
AND
DRYING ROOM
ROOM FOR BATH ATTENDANT
OW
S
D
B
H
BATH ROOMS
FLOOR DRAIN
SEATS
WAITING ROOM
READING TABLE
SEATS
BARBER SHOP
ENTRANCE
SEATS

Fig. 90. Plan of Barber Shop Spray Baths.

wait for a bath. The eight sprays should be in charge of a special attendant, who would also look after the hot-water heating apparatus, which might be placed in the rear, in the room marked "Laundry and Drying-room."

With regard to baths for hotels, it should be mentioned that some hotels at summer resorts are provided with regular swimming pools. An example of this kind of bath, consisting of a covered swimming pool at the Hotel Mount Washington at Bretton Woods, N.H., is mentioned in the next chapter.

The modern spray or rain bath, described in the preceding chapters of this work, is also pre-eminently adapted to the needs of the cheaper lodging houses. As a rule, lodging houses are provided with tubs which have only a cold-water supply. These are, of course, not a strong inducement to the people patronizing such places for taking a cleansing bath. But even where hot-water service is installed, the tub baths are not, as a rule, attractive. As one sociological report states, "The tubs are never cleaned, judging from their appearance." Perhaps they are best described in the words of one of the guests of a lodging house, who said, "It is bad enough to have to sleep in a lodging house without having to use their tubs."

I would be strongly in favor of giving the Board of Health sufficient power to order the removal of all tubs from lodging-houses and the substitution in their place of clean, inviting and economical rain or shower baths.

CHAPTER XIV

RIVER AND SEA BATHS

RIVER, lake and sea baths are patronized in summer time by the masses from large cities because during hot weather the body cannot readily give off its heat. The cool water draws out the surplus heat from the body, and thus refreshes and tones up the system.

In the case of sea baths the beneficial effects are due to a number of other factors, such as the composition of the sea water, the invigorating shock caused by the impact or mechanical pressure of the waves upon the body, the exercise in the open air, and the breathing of the pure ocean breezes. Thus sea bathing has come to be considered an important aid to the preservation of health, and even warm sea-water baths, taken in tubs, are sometimes of much benefit to the constitution of weaker persons who cannot endure the surf baths.

The choice of location for both river and sea baths depends upon a number of factors, such as the character of the water, its degree of cleanliness, its current, the shape of the river banks or the condition of the beach.

Baths situated upon the banks of a river should preferably be located *above* the city or town, or at least at a considerable distance from the outfalls of city sewers, away from garbage dumps, and remote from any drains or surface ditches which carry away the wastes from industrial establishments, chemical factories, gas works, etc. The immense river bath of the city of Vienna is on the newly canalized stream, two miles from the city proper, and the baths of Paris, on the river Seine, though located in the center of the city, are safe from sewage contamination, because the sewage is carried by intercepting sewers to a point several miles below the city.

The chief point of difference between river or ocean swimming baths and public swimming baths in cities is that the place for the bathers and swimmers, the pool, is open in the former, while it is covered over in the latter. The open baths are either constructed stationary, or they are floating baths; in both cases they can be used by the public only during the summer season. Instead of an artificially made pool or tank, as in the city baths, a river or an inlet from the same or the sea at a natural beach constitute the bathing place.

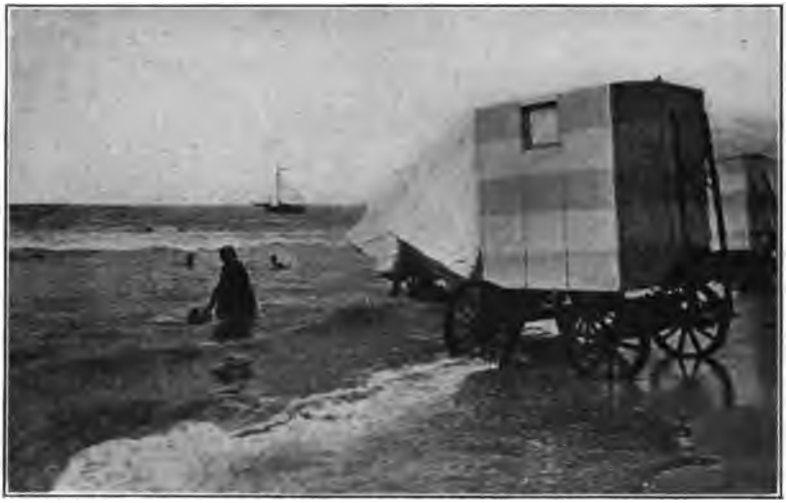

FIG. 91. VIEW OF SEA BATHING BOX, AS USED AT OSTEND, BELGIUM.

In locating ocean and surf baths it is well to choose a locality outside of the harbor proper, where the sea water is more pure, where the beaches are sandy or gravelly, clean and not defiled by city garbage, where there are no treacherous currents or dangerous undertow, and where the beaches are free from pebbles or larger stones. A hard sandy beach, with a very gradual descent into deeper water, forms the best bathing ground. The pollution of the beach, either by sewer outfalls from seashore hotels, or by city garbage dumped into the sea too near to the shore and cast up by the waves and the tides, must be prevented.

River, lake and sea baths are the least expensive form of bath, and they generally require simple architectural structures, though there are some examples of more pretentious structures, such as the Sutro baths near San Francisco, and the Revere Beach baths near Boston. Many examples of plain beach baths are found in Chicago, Baltimore, Cleveland, Detroit, Milwaukee and Boston.

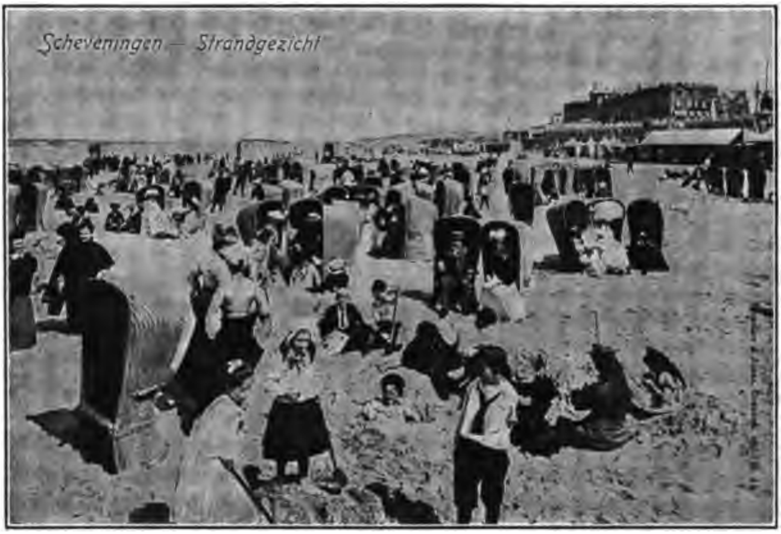

Fig. 92. View of Bathing Beach at Scheveningen, Holland.

For sea and surf bathing it is not usual to provide a swimming bath, but there are some ocean baths which have both the dressing pavilion and the swimming bath enclosed. Such structures are erected either on piles or on floats or pontoons.

The structures are of three kinds, viz., first, simple movable cabins, or bathing machines for one or two persons, set on wheels and drawn up or down on the beach, such as those used at the seaside resorts of Belgium, Holland and France, which may be seen at Ostend, Blankenberghe, Scheveningen, Noordwijk, Katwijk and Zantvoord, and of which Figs. 91 and 92 present good illustrations.

The bathhouses on wheels appear in Fig. 92 in the distance, while the beach in front is dotted with queer-looking wicker chairs, provided with hoods as a protection against the sun and the winds.

In other cases the dressing cabins are stationary, and built in long rows or groups immediately in front of the beach, but beyond the reach of the highest known tides. Examples of these may be seen at many of the American coast bathing resorts.

An elaborate example of a surf bath house is the Revere Beach bath house, erected in 1897 by the Board of Metropolitan Park Commissioners of the City of Boston, at a cost of over $100,000. It consists of immense permanent buildings intended to furnish accommodations and necessary conveniences for surf bathing. In the center is the administration building, of brick and terra cotta, two stories in height and 80 feet by 75 feet in size. At the right and the left of the center building are the yards containing the dressing rooms. The yards are enclosed on the beach front by brick walls; at the rear there are bicycle storage sheds. The dressing rooms are of wood, with tar and gravel roofs, and there are two tiers of these. The bath yard for men is 165 feet by 93 feet and contains 602 dressing rooms; the one for women is 165 feet by 67 feet and holds 402 dressing rooms. The size of each dressing room varies from 4 feet by 6 feet to 4 feet by 4½ feet. Each room is furnished with seat, hooks and mirror. Plenty of fresh-water showers are also provided. The first floor of the administration building contains the offices where the bath tickets are issued; also an office for the distribution of bathing suits, and a room for the deposit of valuables; there are also retiring rooms and storage rooms for bathing suits. The basement contains the boiler room, coal bins, general storage, and toilet room, also a hospital room. The second floor contains the well-equipped laundry, an office, repair and linen room and employees' toilets.

Constructions similar to those for ocean baths are adopted for river baths. They consist of a series of dressing cabins, built on the shore, with the bathing place open and direct in front of them, or else river baths are built on a floating dock, or pontoon, anchored in the stream, with cabins arranged on the four sides, as shown in the illustrations, Figs. 93 and 94.

For many years cities like New York, Boston, Philadelphia, Washington and Brooklyn have maintained during the summer months free floating swimming baths. At present there are twenty of these baths in New York (five in the Borough of Brooklyn, fifteen in Manhattan), about a dozen in Boston, and one in Washington. They are located at various convenient places

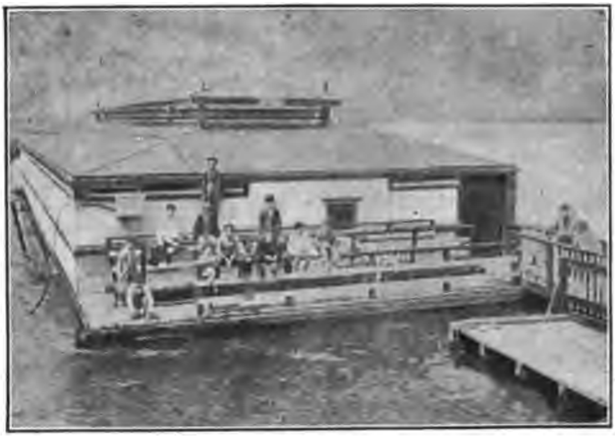

FIG. 93. VIEW OF FLOATING RIVER BATHS.

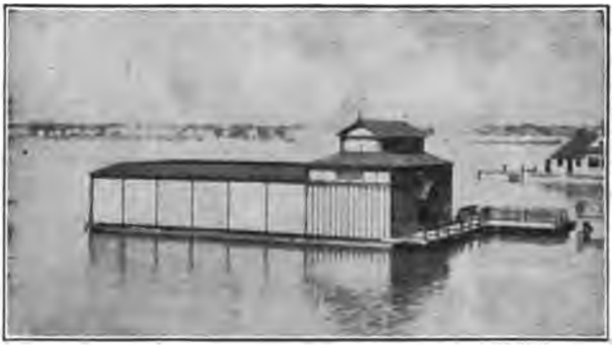

FIG. 94. VIEW OF FLOATING RIVER BATHS.

along the water front. The New York baths are large wooden structures, about 64 by 94 feet in dimensions, which originally cost a good deal of money, but some have not recently been kept up and are in a more or less dilapidated condition. These baths are floated on water-tight wooden compartments, and contain about 60 dressing rooms, which are covered over and which surround an open pool about 40 by 70 feet in area. This pool is provided with a wooden slat flooring with wide openings, through which the water flows. The average depth of water in the pool is five feet, but a few baths have two different depths, one for swimmers, the other for non-swimmers.

It is estimated that several millions of bathers use these baths during the three summer months. In past years these floating baths have served a useful purpose, but recently it has been more and more difficult to find a location for them which would be free from sanitary objections, owing to the increased volume of sewage which is poured into both the East and the North Rivers through the sewers of both municipalities. For this reason it seems to be only a question of a few years when they will have to be abandoned altogether.

Since to many people of slender means the ocean is not readily accessible, the baths have been a valuable means for recreation and healthful exercise for men and women, boys and girls. If floating baths can no longer be used, some other and better substitute must be found. We have seen in Chapter VIII that the latest people's baths of New York provide large swimming pools with this in view. (See Fig. 39.)

Precautions regarding the purity of the water may be relaxed in cities situated on rivers, the current of which is very rapid, as in the river Rhine. In the Seine at Paris, with a depth of four meters, the current is such that only a good swimmer can ascend the stream, and at the river bath of Buda-Pesth the current is still swifter.

Instead of having floating river baths, some cities have larger permanent stationary structures, which are built out from the shore, on pile or concrete foundations. (See Fig. 95.)

At some seaside summer resorts, where the ocean water is very cold, even in July and August, special bathing pools, containing salt water, are used, in which the water is warmed by being allowed to stand for some time exposed to the sun's rays. Where the relative levels are favorable the tanks may be conveniently filled at flood tide, and be emptied at low tide, without having to use pumps. Where pumps are required to lift the water this can be done at a low expense by using either steam pulsometers or else steam ejectors, the advantage in both cases being that the water while being pumped is suitably warmed by the incidental admixture of steam. In other cases electric centrifugal pumps are used. Such baths should generally be protected from winds by enclosing walls.

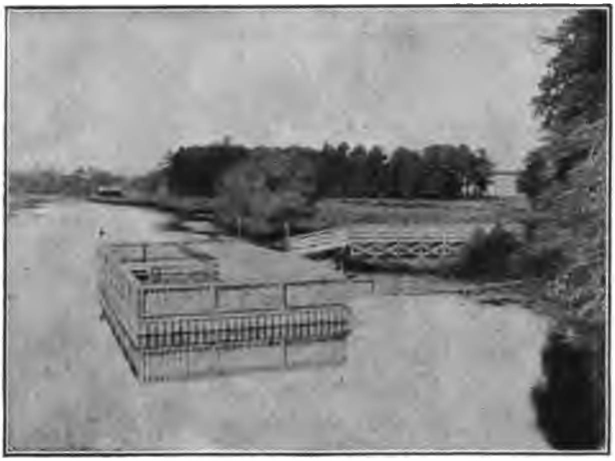

FIG. 95. VIEW OF RIVER BATHS.

Brief mention should be made in this chapter of the outdoor swimming pools for country houses, clubs and hotels. Quite recently the use of such outdoor swimming pools has been suggested as private bathing places for country houses. They would doubtless prove very popular if they could be built at a reasonable cost. The objection seems to be that they could not be used except during a very short time in the summer months. Heating of the water would be out of the question on account of the complication and expense. For this reason such pools should be built shallow, so that the sun's rays may warm up the water somewhat.

A brook or running stream may be dammed up and changed into a pool above the site of the dam; in other cases an artificial tank is located at a lower level than the water in the creek at the dam, and it may be fed by pipes conducted from the creek to the pool.

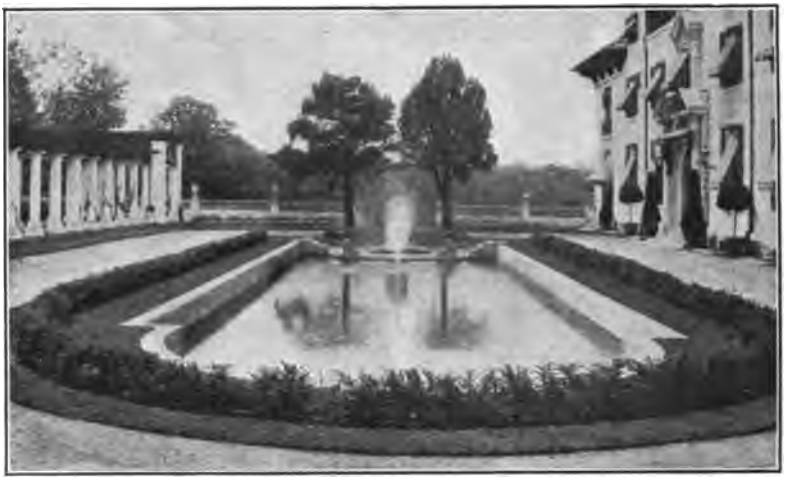

FIG. 96. OPEN PLUNGE BATH FOR A COUNTRY HOUSE.

Outdoor pools may be built cheaply in concrete, or else may be more luxurious marble or glass lined ponds, such as the one illustrated in Fig. 96 (taken from a recent number of *Country Life in America*), which is supplied by an ornamental fountain, thus also serving as an attractive feature in the landscape.

Fig. 97 illustrates a simpler circular cement swimming pool, built in Pennsylvania for the use of the operatives of a factory. It is 80 feet in diameter and from 3½ to 7½ feet deep. The walls are of stone, lined with brick, and the bottom is of concrete, rendered smooth by a lining of Portland cement. All angles of such pools should be well rounded and there should be no projecting corners to injure the bather. Open pools should not be located under or too close to trees, on account of the leaves falling into the water.

At Bar Harbor, Me., there is a bathing pool filled with salt water at flood tide; it is used there because the water is too cold, even in July and August, to permit of bathing in the bay.

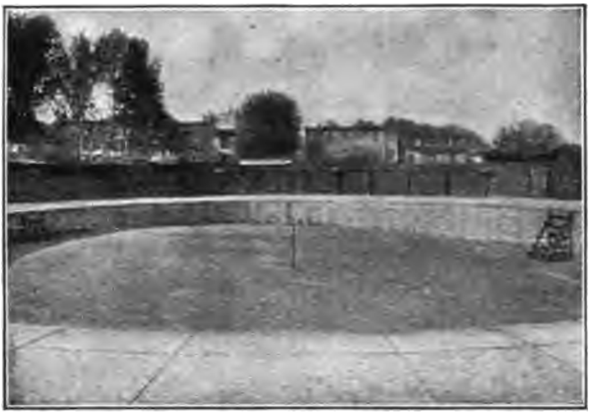

FIG. 97. SMALL OPEN CIRCULAR PLUNGE BATH FOR WORKINGMEN.

A conspicuous feature in the basement of a large hotel in the White Mountains, for which the author planned and executed the entire water supply and sanitary arrangements,* is an indoor swimming pool, 20 feet by 65 feet in size, and varying in depth from 4½ to 7½ feet. It is believed that no other hotel in the mountains possesses such convenience. The pool is lined with white tiles, and the water may be tempered by means of steam coils running around the bottom of the tank. The pool is supplied with pure and sparkling water which comes from a mountain brook some miles away. Tepid clean water also runs into the pool continuously, which comes from the ammonia condensers of the refrigerating machinery. The floor surrounding the pool is of marble mosaic, and the pool is guarded by a brass rail. Near the pool are ample lockers, dressing rooms, bathrooms and showers.

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* For a complete description see the author's book, "The Sanitation, Water Supply and Sewage Disposal of Country Houses," D. van Nostrand Co., 1908.

CHAPTER XV

AIR AND SUN BATHS*

"AIR BATHING" signifies bathing in the open air, or, in other words, the exposure of the unclothed body to the air, generally in connection with light gymnastic or air-breathing exercises or with Swedish movements or sometimes with walking, jumping and running.

Sun baths are baths in which the nude or partly nude body is exposed to the beneficial action of the light rays of the sun; these are usually taken without bodily exercise, and give a higher effect than air baths.

Both are comparatively new methods of bathing, for we are only beginning to appreciate the strengthening and healing effect of air and sunlight on the human body and the human system. Both methods, when judiciously practiced, have shown more than a moderate amount of success.

I have explained in Chapter III, in speaking of the different forms of baths, that baths may be taken not only in *water*, but also in other media, such as, for instance, *air*. Air baths are, indeed, the oldest form of bath, for according to biblical history, Adam and Eve practiced air bathing, perhaps unconsciously, until they were driven from paradise.

No matter how much we may like a refreshing douche or spray of water, or an invigorating swim in the river or in the ocean, we cannot shut ourselves off from the undisputable fact that, to quote Dr. Lahmann, "man is not an amphibious animal"; he is not a creature of the watery element. We are not intended by nature to live in water, we are, on the contrary, "children of the air," because of the fact that we are born without clothing, that we are surrounded by air, and that we cannot exist even for many minutes without it. We take air internally into our lungs, and externally we require air for the skin which envelops our bodies. We exhale and eliminate through our skin as well as through our lungs.

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* See the special literature on air and sun baths at end of Chapter XVIII.

If this proper function of the skin is stopped or interfered with for only a very few minutes the results may be serious or, indeed, fatal. Who has not experienced the oppressive feeling when, in the midst of a crowd of people, even in the open air, we find ourselves unable to radiate off our surplus animal heat?

The requirements of modern civilization and culture are not favorable, in some sense, to this vigorous action of the skin. The clothing, which we are obliged to wear, for various reasons, interferes with the functions of the skin; all clothing excludes too much pure air from our body.

If the eliminating action of the naked skin is called 100, then that of a body with a woolen shirt on is as 73, with woolen and linen shirt it is 60, with vest added it becomes 40, and with both coat and vest only 33. (Lahmann.) What it is when we go outdoors clad with overcoat with lining or with a fur garment has not been established, but it would seem as if it were near to zero.

Civilization requires the wearing of clothes, fashion dictates the kind and number, and try as we may we cannot emancipate ourselves from that. All clothes prevent the free perspiring, the free exhalation of the skin, and tend to cause a poisoning of our system. We can, however, help matters by giving the skin once or twice daily an opportunity to breathe freely.

The care of the skin by means of water baths may be well enough, but friction of the skin by massage is better, and a free exposure of the skin to the air is by far the best.

The human skin is able to endure low temperatures if accustomed to them. This is largely a matter of habit and of getting used to it. The exposure of the skin to the air not only hardens the body, but it also strengthens the nervous system and stimulates and brightens up the mind. For this reason many physicians of the modern school recommend the use of "air baths" methodically applied as one of the best known means of hardening the human constitution. Of course we must consider the fact that we have been made so sensitive and delicate by being always clothed, and generally with too much clothing, that we can and ought to accustom ourselves only gradually to such exposures.

Indeed, medical practice in Europe has shown that while there are some persons who are unable to stand cold-water applications as a means of hardening the body, only very few, if any, are unable to take the "air baths," provided they are begun gradually, in the manner indicated further on.

As a matter of fact, air bathing, while little mentioned until recently, is not at all new or untried. The Greek youths practiced air bathing in their gymnasia. We have seen in Chapter I that the ancients practiced bathing *of all kinds;* they did not restrict themselves to the immersion of the body in water; they knew the curative value of watery vapors or steam and of the air and light on the skin. After their usual daily bath they used to walk naked in the air for a long time.

History furthermore tells us that the Romans knew the value of sun baths, for they built adjoining their houses special "solaria," or sun rooms, in which they kept the nude body exposed to the healing rays of the sun. Hippocrates also knew the value of light as a healing medium. In his trip across Greenland the explorer, Frithjof Nansen, learnt that the Eskimos took air baths in their tents; he found that they knew that the tight and nonporous furs, which they are obliged to wear outdoors, impede a healthful action of the skin and prevent it from eliminating waste matters promptly. So as soon as they enter their tents they cast off all clothing, to the utter astonishment of Nansen, who was not accustomed to such sights. In the same way it is said that the Patagonians run about in the open air naked even in winter time, and the same is related of the Japanese and the people of Finland.

It is not generally known that the famous Benjamin Franklin practiced air bathing regularly. In a letter which he wrote to a friend in 1773 he stated that he practiced air bathing daily, and called the bath a hardening, strengthening and tonic bath. Here are his own words: "To me the shock of cold water has usually been too strong, and I have found it much more agreeable to my body to bathe in another element, namely, in 'fresh air.' For this purpose I rise early every morning and sit down for half an hour, or even an hour, according to the season, without putting on any clothes, reading or writing in my room."

The Belgian author and poet, Maurice Maeterlink, praises the custom of exposing the nude body to the air; he sees in it the reason for the hitherto unattained perfection of the art of sculpture of the Greeks. "In all arts," he says, "the cultured nations have come nearer to or have got farther away from the ideal of beauty in proportion as they came nearer or farther away from the custom of going without clothes. The principle of the beautiful in art was to the Greek the beauty of his body, and according to the model of his nude and perfectly developed and shaped body he erected his temples and his palaces, molded the style of his dwelling, and the form, proportions and all ornamentation of his articles of daily use. The Romans, likewise, were indebted for their beautiful creations to their custom of going about naked."

In our own times we find a practice similar to that of the old Greeks existing at the beach bathing resorts, for many are those who prefer to walk up and down the beach in a light bathing costume rather than go into the watery surf. What is this other than a form of air bathing?

A Frenchman, Michel Seigneur de Montaigne, is said to have published some writings in 1580 in which he urged the adoption of the air bath, and several physicians contributed to the early literature on the subject. Among the greatest promoters of the air bath of the nineteenth century should be mentioned a Swiss layman, Arnold Rikli, who opened up in 1865 an "atmospheric cure" for patients in Veldes, Austria, and who came to be known among the peasants as the "sun doctor." To him is due the saying:

"Wasser thut's freilich,
Hoeher jedoch steht die Luft,
Und am hoechsten das Licht."

("*Water* accomplishes cures,
But higher than water stands *air*,
And highest of all the *light*.")

Dr. Heinrich Lahmann, at his sanatorium at "Zum Weissen Hirsch," near Dresden, favored the milder form of light and air bath, and since 1898 became its foremost champion. Many others, devoted to natural methods of curing, followed with the installation of air baths, for instance, Dr. Gossmann at Wilhelmshoehe, near Cassel; Adolf Just at "Jungborn" in the mountains of the Hartz, and since 1895 a general movement has sprung up and spread rapidly throughout Germany in favor of these baths, largely at the instigation of the Societies for Natural Methods of Healing and Living (Vereine fuer naturgemaesse Heil-und Lebensweise).

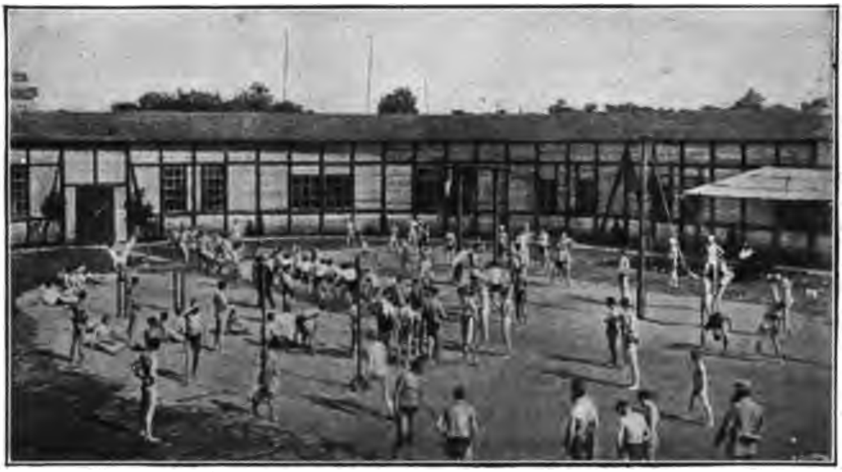

Fig. 98. View of the Public Air Bath for Men at the Kurfuerstendamm, Berlin.

At many sanatoria one finds nowadays provision for air bathing by suitable enclosures, where one can exercise, clad only in the scantiest of clothing, as shown in the various illustrations of this chapter.

Many municipalities have likewise erected such baths, consisting of meadow, pasture or grass land enclosures on the outskirts of a city, surrounded by very high board fences, and

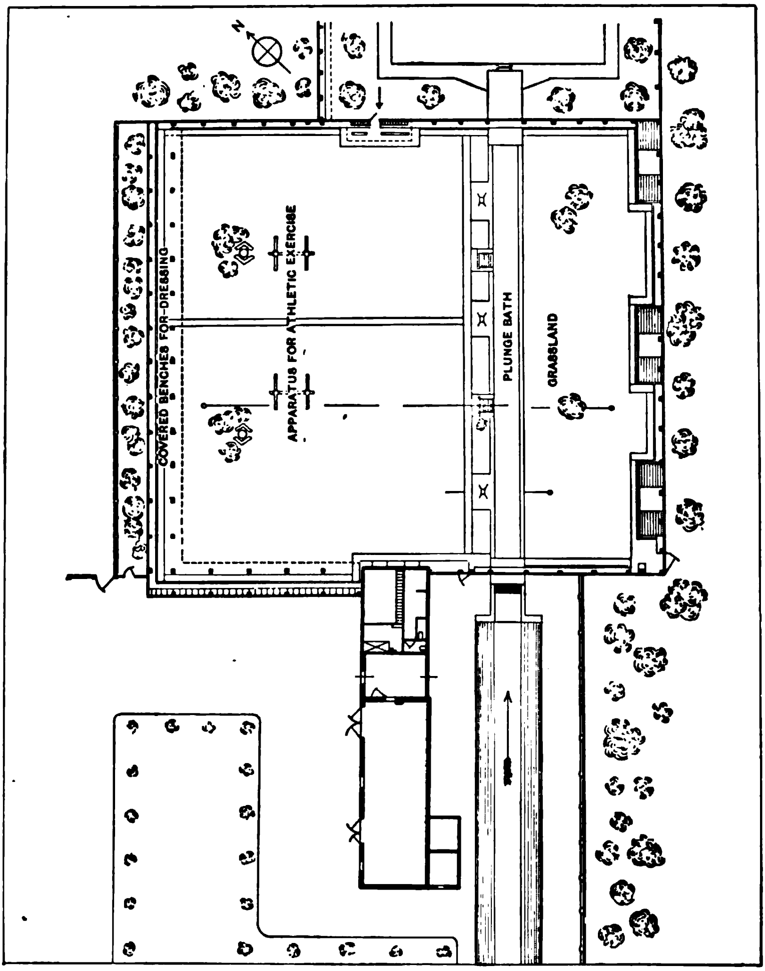
N
COVERED BENCHES FOR DRESSING
APPARATUS FOR ATHLETIC EXERCISE
PLUNGE BATH
GRASSLAND

Fig. 99. Plan of One of the Municipal Air Baths in Munich, Germany.

provided with numerous dressing compartments and with some gymnastic apparatus and a shower bath for use after a sun bath.

Fig. 98 illustrates a view of the public air bath at the Kurfürstendamm, in Berlin. Fig. 99 shows the plan and Fig. 100 the arrangement of a public air and sun bath in Munich.

Fig. 101 shows a view in the municipal air bath of Munich, located at the station Maria-Einsiedel, of the Isar River Valley Railroad.

The entrance fee at such baths is usually very low, on the average from two and a half cents to five cents, as I found it in some cities. Austria and Switzerland have many such public air baths. Recently Dr. Pudor suggested the introduction of air baths in the public schools, but this would hardly be necessary if parents would only accustom their children at home to harden their bodies by air bathing.

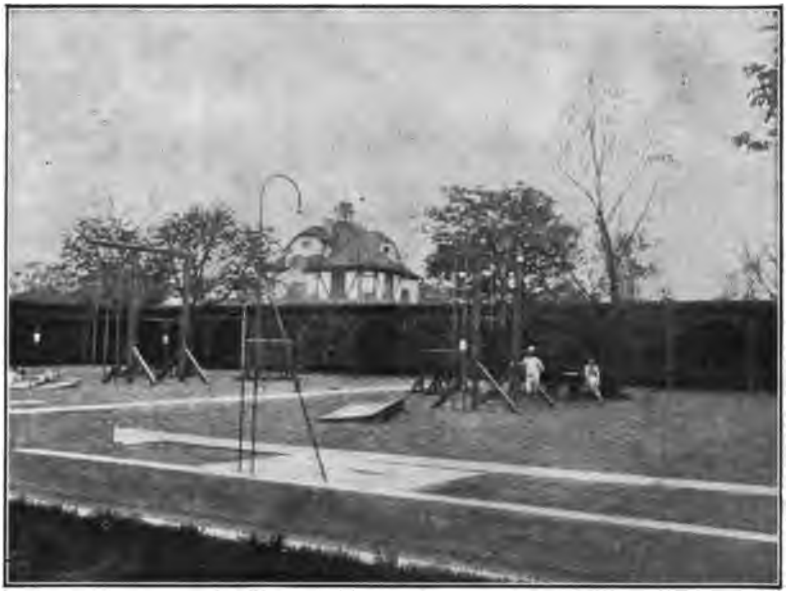

FIG. 100. VIEW IN THE MUNICIPAL AIR BATH IN MUNICH GERMANY.

The question seems pertinent, what good is to be accomplished by air baths?

An air bath, together with light bodily exercise taken in the garb of nature, serves to harden and strengthen the entire body. It gives it an opportunity to radiate off heat. An actual experience and observation of the author will perhaps illustrate this best: during air bathing practiced at a sanatorium in a roof solarium, with *all windows wide open,* when the outdoor temperature was below the freezing point, the indoor temperature rose in twenty minutes from +6° C. to +14° C. (42° to 57° Fahr.). During this time there were present about thirty patients practicing breathing exercises. The rise of 15 degrees in temperature was due entirely to the surplus heat given off by the bodies of these thirty people. One can infer from this how much heat and how many exhalations are given off in a dense crowd of people! Is it any wonder that many persons faint in such crowds?

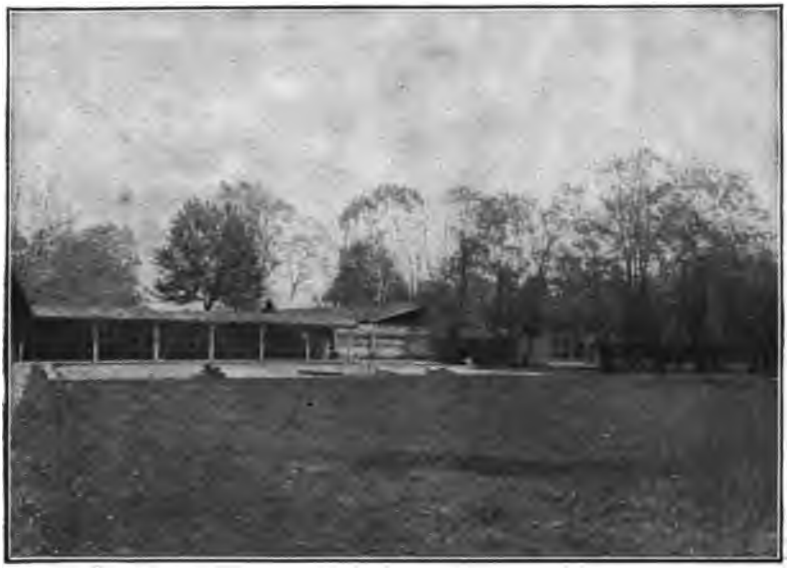

FIG. 101. VIEW IN ANOTHER MUNICIPAL AIR BATH OF MUNICH, GERMANY.

Air bathing is particularly adapted to those persons who are compelled to lead a sedentary life. A better blood circulation always results, also a better assimilation of the food, which is of the utmost importance and a first condition for well-being.

The air bath hardens skin and body, assists the work of the lungs, increases skin excretions and improves the eliminating action of bowels and kidneys. It reduces some forms of nervousness, cures rheumatic affections, and is excellent in the treatment of obesity. It improves the quality of the blood by increasing circulation. It improves the outward appearance of the skin and is helpful in some skin diseases. The air, assisted by the action of the light rays, acts stimulating and as a tonic for the system. After practicing air bathing for a while morning and evening, and continuing the bath from the summer until well into the winter, one finds it possible to wear lighter or more porous clothing or else less clothes. One of the best accomplishments is that it prevents catching cold.

Fig. 102. Group of Athletes in the Air Bath.

How, where and when is the air bath taken? How often and how long?

Where other opportunities for this healthful practice are lacking, one may take air baths at any public bath house and at the river, lake or ocean baths, or in specially prepared simple enclosures, provided they are not overlooked by neighboring buildings.

The air bath consists, as we have seen, in the removal of all clothing (save a small loin cloth) from the body, and of the bathing of the body in the air. (See illustrations, Figs. 102, 103, 104.) It is most beneficial if taken outdoors and during the daytime, because then the action of the sunlight is added to that of the air, the bath becoming really a light *and* air bath, or a sunlight bath. If the sun is too strong one goes into the shade, but in winter one goes into the sun to keep warm.

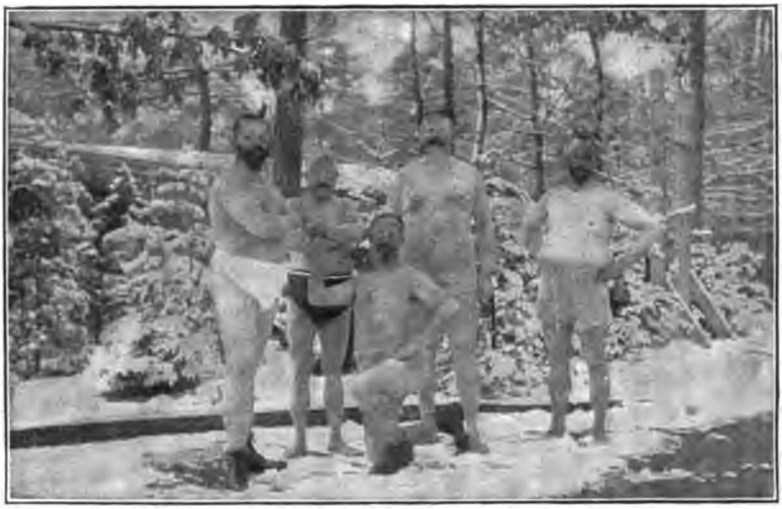

FIG. 103. GROUP OF PERSONS TAKING AN OUTDOOR AIR BATH, AFTER A SNOW FALL, TEMPERATURE OUTDOORS BEING 28° F.

A novice should begin during the warm season by taking air baths in his room. Windows should be opened, at first, a little and soon wider, and during the air bath of five minutes' duration some light exercise should be taken and the feet should be protected. Deep breathing exercises are much to be recommended. After the air bath a brisk walk is advisable. Gradually the length of the bath can be extended from five to thirty minutes, and finally one will be able to take baths twice daily. As soon as the state of the weather permits, and where facilities for outdoor bathing are available, it is best to venture out into the open air and to take the bath outdoors. Do not stay too long at first. It is surprising, however, how soon one gets used to the air exposure. Almost at once both body and mind begin to improve,

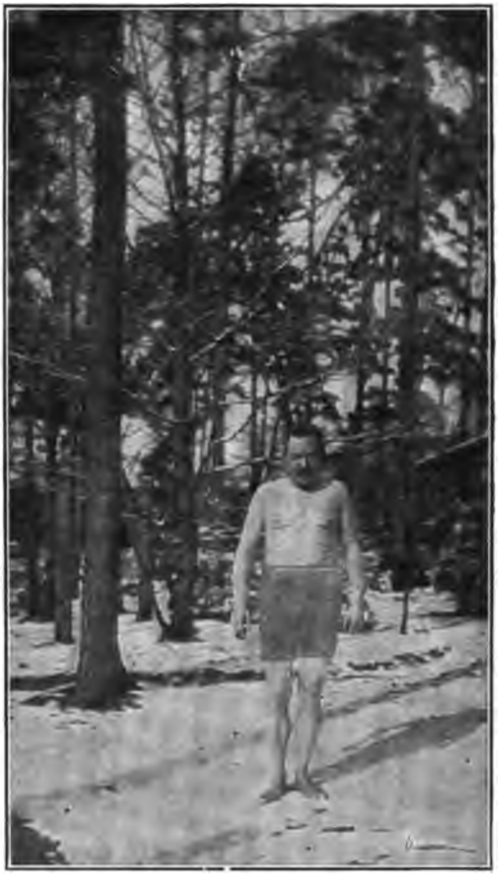

FIG. 104. PERSON TAKING AN AIR BATH IN THE WOODS, AFTER A SNOW FALL, TEMPERATURE OUTDOORS BEING 28° F.

and one soon experiences the exhilarating and beneficial physical effect of the bath. One does not only *feel* so, one actually becomes so. One may easily become accustomed to a bath of one-half hour's duration with the temperature at 42–46° Fahr. And what is more surprising, one finds one's self able to continue the baths far into the winter, even after snow has fallen, provided the air is dry. (See Figs. 103 and 104.) But, of course, just as soon as the air becomes cold, it is advisable to take more active gymnastic exercises.

After a personal experience extending over a month's time, the author can vouch for the fact that it is a very rare experience to find persons who take air baths catching cold or suffering from catarrhs. After a week's trial many persons are able to go unclothed out of doors, even when the thermometer stands below the freezing point. It is, of course, required, at such times, to take brisk walks in order to keep the blood in circulation, or to jump or run for a while, or else to practice friction exercises by rubbing the body with the hands. Many delicate persons are said to stand air baths better than cold-water baths. It gives them a delightful feeling of bodily well-being, a feeling of lightness, brightness and of cheerfulness.

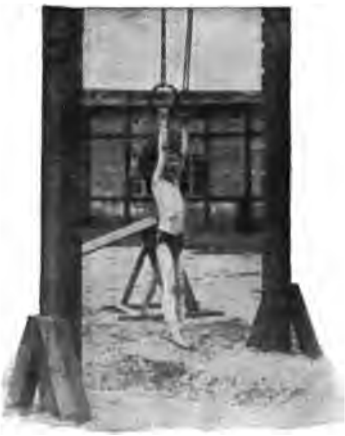

FIG. 105. ATHLETIC EXERCISE IN THE AIR BATH.

Air baths are beneficial not only for men, but also for women, and particularly for the young children. (See Figs. 105 and 106.) Air baths in summer time are better for children than bathing in the river or in lakes.

In a recent article on "Air and Sun Baths," the New York *Tribune* said the following:

> **Progressive German parents are building sun baths for their children, small enclosures in the garden or on the roof, where the little ones can disport themselves**

in the garb of nature. The effects of the treatment are said to be marvelous. The little people become immune to colds, and anæmia, scrofula and nervous troubles, to mention only a few, are said to disappear as if by magic. Well children become still stronger, and even weak and delicate children become so accustomed to the contact of the atmosphere with their naked bodies that they go out of doors unclothed, even with snow or ice on the ground.

A child begins its air baths in a room with open windows. Then it goes out of doors on warm days and thus gradually becomes accustomed to all weathers at all times of the year. He exercises and plays games while in the air bath in order to keep warm. Special exercises are recommended for this purpose, and when necessary the skin is rubbed.

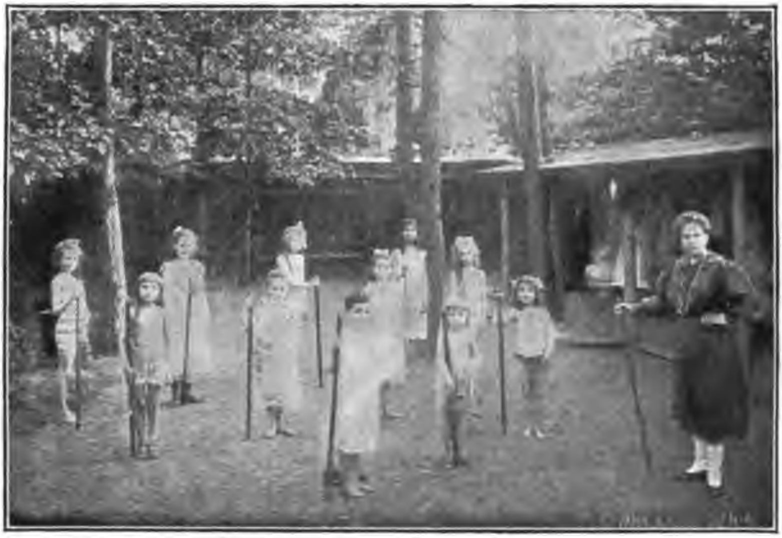

FIG. 106. CHILDREN DRILLING IN THE WOMEN'S AIR BATH.

The sun bath is not so universally beneficial as the air bath, and it is considered wise to consult a physician before trying it. When recommended it is taken in conjunction with the air bath. All that is required for the sun bath is some kind of shade for the head and a watering pot. The body is exposed to the sun for from twenty minutes to an hour, and is then cooled off by a shower of not too cold water from the watering pot.

The pioneers of this movement were subjected to much ridicule, but now they have an army of followers.

What should appeal to every one forcibly is that the air bath calls for scarcely any preparation. It requires no fixtures, no fittings, no appliances of any kind, and no expensive bath houses with elaborate plumbing. As appears from some of the illustrations, the air bath is arranged on soft meadow ground by erecting suitably high fence enclosures. Inside of these are provided simple dressing-compartments, and a few gymnastic apparatus are set up. For those who practice "sun bathing" a simple spray bath should be installed.

FIG. 107. ATHLETIC EXERCISES IN THE AIR BATH.

The author was astonished to find during his trip in Europe that many German cities had provision made, either by private health associations or by the municipality, for extensive air baths, which were very largely patronized. The devotion of the Germans to gymnastic exercises is well known, and in the air bath they find ample opportunity to indulge in their favorite sports. (See Figs. 107, 108, 109.) As one of the illustrations shows, Fig. 110, bowling is a favorite pastime, and playing tennis or golf might well be added, and would surely find some enthusiastic followers here.

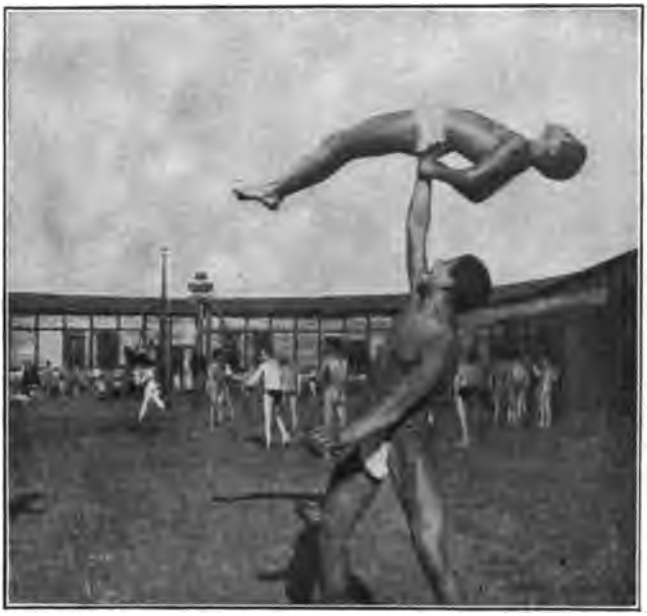

FIG. 108. ATHLETIC EXERCISES IN THE AIR BATH.

Even the members of the orchestra playing favorite airs, indulge in the air bath. (See Fig. 111.)

The best exercises to take while air bathing are the correct breathing exercises and Swedish movements, and in Germany there is generally at the air bath, particularly in the sanatoria, a drill master who teaches these movements and superintends the bathing generally.

It seems about time that such widely beneficial institutions were provided for the masses in our own country, though I must admit that the months of July and August appear to me to be unfit, in this semi-tropical climate, for the exposure of the body, except in well-shaded places.

The roofs of many of our city dwellings could readily be made suitable for air baths. The suggestion to use them as playgrounds is not new, why not go a step further? For winter time solaria or glass-covered places should be provided. In other cases the back yard, or a part of it, may be rendered fit for the practice of air bathing by partly roofing it over to avoid exposure. Wide balconies, porches or loggias, well sheltered from exposure by light bamboo screens or blinds, may be used.

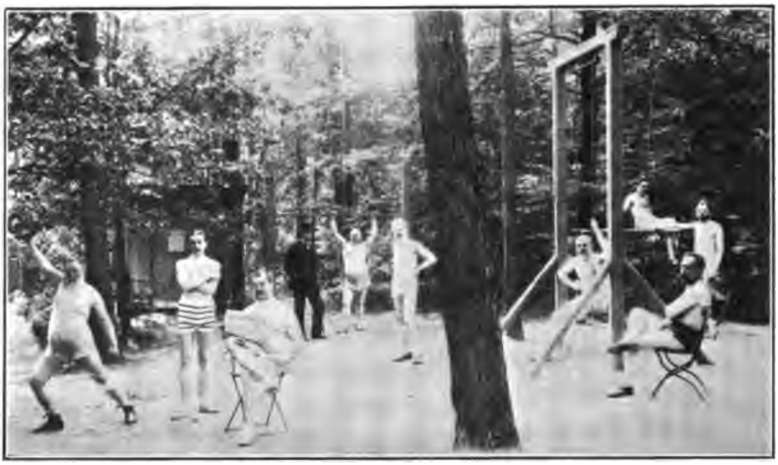

FIG. 109. GROUP OF PATIENTS TAKING THE AIR BATH.

In open-air bathing damp grounds and windy spots should be avoided; always keep out of drafts of wind and avoid exposure to rain. Do not bathe directly after a meal, and do not eat or drink during the bath.

The majority of persons, after practicing air bathing for some time, find it necessary to institute a reform in their clothing, by discarding all heavy underwear even in winter time, and wearing only the lighter, more porous and open-mesh garments.

Persons who take air baths always sleep with the windows wide open, and lose all fear of the "night air." Those afflicted with insomnia find it sometimes of advantage to rise and take a short air bath during the night.

In summer time, with a temperature of the air at from 67 to 77° Fahr., any one can take an air bath of 10 to 30 minutes' duration, the best time for the bath being about nine in the morning or four in the afternoon. In winter the room should be warmed to 67° Fahr., and the air bath can be continued with good results, light gymnastics being practiced during the exposure to the air.

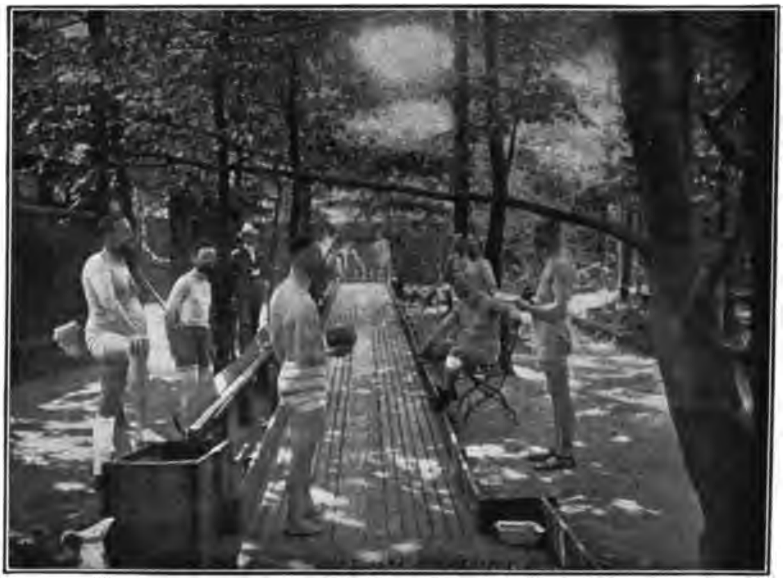

FIG. 110. BOWLING SPORT IN THE AIR BATH.

How much cleaner and nicer is such a bath than the inhaling of the usually foul air of many of our Turkish-bath establishments!

"Sun baths" should not be confounded with air baths, for they are essentially different types of baths. If the body is kept exposed in the open air to the action of the sun's rays, the bath becomes a sunlight bath. It is well known that the energy of light rays is beneficial to the human system. Sun baths, in order to be beneficial, should be of much *shorter duration* than air baths. In taking a sun bath the head, the neck and the eyes must be well protected from the direct sun rays. The position of the body should be frequently changed so as to expose it on all sides. The duration of a sun bath should not exceed 20 to 30 minutes, at the end of which time usually free perspiration has set in. After the bath one should take a full water bath of 90 to 95° Fahr., and finish up with friction rubbing; or one may cool off the body by going into the shade and afterwards taking a cool spray.

FIG. 111. BAND PLAYING IN THE PUBLIC AIR BATH FOR MEN.

Sun baths should only be taken under medical advice, for in some persons they cause headaches, heart palpitation, nausea, dizziness, etc. In our semi-tropical climate of the summer months there would seem to me to be danger of both sun and heat strokes, as the sun is then too strong, therefore sun baths should not be taken here during the hottest months.

Sun baths may be taken in solaria, or in open halls protected on the sides against wind, or in roof gardens of city houses. The drawback attaching to them is that one is dependent on the weather for a sun bath. This was one reason which led to the invention of the electric light baths, which may be considered "artificial sun baths," but which at best are only weak imitations of the natural sun bath. For a discussion of these see Chapter XVI.

Modifications of the air bath, which require but brief mention, are the dew bath, or the walking with bare feet and naked body in the wet grass (after Father Kneipp); the "genuine rain bath," *i.e.*, the walking in air-bath costume during a rainstorm, which is only intended for those with strong constitutions; the earth, sand and moor baths; and finally the snow bath, practiced by the Finlanders, the Japanese and the Patagonians. One may either roll in the snow outdoors, or else gather a pail of it, bring it into the room and rub the body with the soft and warm snow.

CHAPTER XVI

MEDICAL AND ELECTRIC-LIGHT BATHS

THE term "medical baths" comprises a large variety of special baths, in which various media are made use of for healing purposes.

According to the media more frequently employed we have water baths, either cold or hot, also hot springs containing mineral salts; hot-air and steam-vapor applications; steam baths; carbonic acid gas baths; mud and fango baths; hydro-electric baths; electric light baths, and the air and sun baths, already described in the preceding chapter.

Water may be used in tubs, in douches or sprays, in full or local wet packs, in wave or current form, and finally in connection with currents of electricity in the so-called "hydro-electric" baths.

Each of the medical baths mentioned will be briefly described in the following.

Those forms of medical baths in which the water used is not ordinary water, but a mineral spring or possibly one of the hot springs, depend for their location entirely upon the locality where the springs flow or are found issuing from the earth. In the case of hot springs the volume of water available is sometimes so limited as not to be sufficient for single tub bathing, in that case the hot-spring baths are taken in pools in which several persons bathe together.

The use of cold water in its various forms of application has been known for many centuries. Some of the ancient Greek physicians, among them Hippocrates, Asclepiades and Galen, are said to have favored water treatment of disease. In Germany the treatment received a fresh impetus when Vincent Priessnitz founded in 1830 his institute, which afterwards became world-famous as "Kaltwasserheil-Anstalt." He declared against the administering of medicines internally, and cured entirely by cold-water applications, such as general and local baths, seat and foot baths, douches, wet packs, wet rubbing and cold local "Guesse," or sudden pourings of water on parts of the body. Father Sebastian Kneipp in Woerisshofen also practiced hydropathy to some extent, and the chief modern champion of the water system is Professor Winternitz of the University of Vienna, Austria.

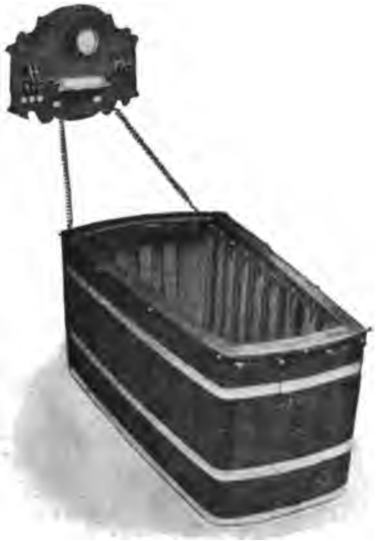

FIG. 112. A HYDRO-ELECTRIC BATH.

Many medical baths consist of baths taken in tubs with warm water in which medical compounds of one kind or another are added and dissolved; of the more common substances so added to water for curing purposes I mention herbs, soda, salts, sulphur, pine needles, carbonic acid gas, and oak-bark solutions (tannin baths), the latter usually in combination with electric currents.

The carbonic acid gas baths are much used in cases of heart trouble, nervous ailments, insomnia, neuralgia, obesity, rheumatism and gout (Nauheim baths.) The gas is mixed intimately with the water and renders it sparkling, bubbling and highly tonic.

A system of water massage is practiced at Aix-les-Bains, in Savoy, France, in which hot and cold douches are used alternately. Water, in the form of steam vapor, is used in so-called steam douches, largely for local applications.

Tub baths in connection with electric currents are called hydro-electric baths; in these the electric current is made to pass through the body of the bather, and they are much employed by physicians for the curing of ischias, gout, rheumatism, neuralgia, abdominal and intestinal troubles, also for sprains and contusions. Fig. 112 illustrates a modern form of such tub bath; besides the full bath there are also used local baths, such as baths for the arms, for the feet, etc. The tub is an oaken tub with metal rods on the long sides, from which prismatic carbon rods, the so-called "electrodes," are hung. The rods are connected by means of wiring to a wall switch, and the current may be turned on full and strong or else weaker, according to the prescription of the physician. At the head end of the tub there is a convenient head rest. The electrodes are removable so as to afford facilities for the cleaning of the tub. The bath may be operated from an accumulator battery of 30 volts strength. Very little current is used. There are no metallic parts in the tub. The electrodes may be removed and then the tub is suitable for sulphur baths, carbonic acid gas baths and the like.

The tonic effect of water in motion has long been known and appreciated. Wave baths were some years ago suggested by Dr. Preiss, and recently they have been advocated by Hofrat Hoeglauer of Munich, Germany. These baths are the outcome of the ordinary wave bath, called in Germany "Wellenschaukelbad," which was referred to in Chapter III, and illustrated in Fig. 3. In this bath the bather himself operates the tub in such a manner as to create wave action, but the device is more or less primitive and has the disadvantage that it cannot be operated by weak persons or invalids, whom it is intended to benefit.

In the new patented "Undosa" motor baths, illustrated in Figs. 113 *a* and 113 *b*, the bathtub is much more roomy and remains stationary. The usual dimensions of such a tub are: length, 2 meters (6½ feet), and width, 1 meter (3¼ feet). The water in the tub is set in motion by paddles driven by a small electric motor, and thus the bather does not have to perform any muscular work. Fig. 114 illustrates another kind of "Undosa" tub, in which currents, and not waves, are created by mechanical means. Cool or else tepid baths with fresh or salt water, and sometimes carbonic acid gas baths may be administered, and the strength of the current or of the wave action may be regulated at will. The value of such baths from a hydrotherapeutic standpoint are conceded by many prominent physicians, particularly in the case of nervous troubles, neurasthenics, pains in the joints, and also for the reduction of obesity, and for insomnia.

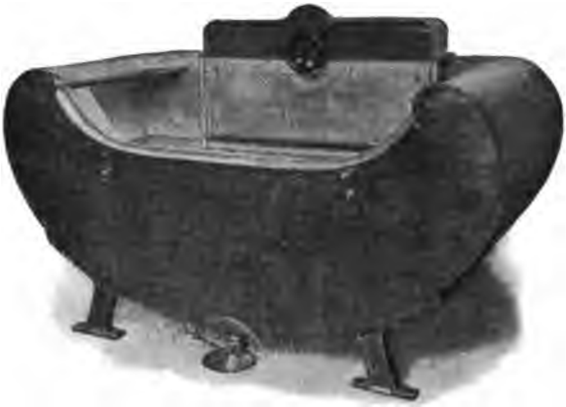

FIG. 113 a. VIEW OF ARTIFICIAL WAVE BATH.

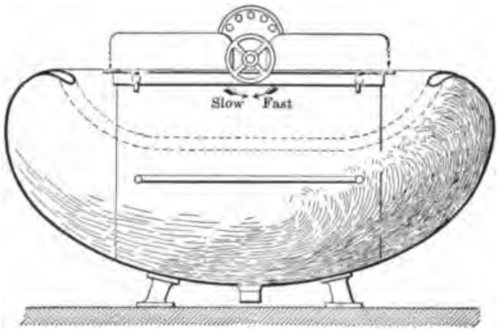

FIG. 113 b. SECTION OF ARTIFICAL WAVE BATH.

The tubs are so shaped that the waves can not run over the top, which is curved so as to throw the water back into the tub. In the "current" bath the water is put in motion by the action of a sort of propeller, as shown in the illustration Fig. 114.

Quite recently practical tests have been carried out with larger "Undosa" wave pool or plunge baths (see Fig. 115), these being intended for those who cannot, for one reason or another, visit an ocean bath. These may also be fitted up in a river or in a lake, of which the author saw an example at Starnberg, on Lake Starnberg, not far from Munich, or they may be arranged in covered swimming halls, and then have the advantage that they can be used the year round. All such baths would seem to lack is the beneficial tonic effect of the ocean air, otherwise they exert a very stimulating action on the nerves and on the skin.

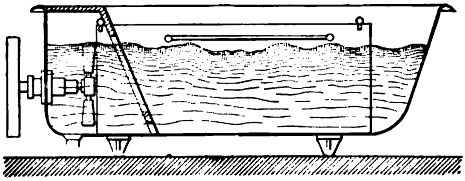

FIG. 114. SECTION OF ARTIFICIAL CURRENT BATH.

Hot air as a healing medium may be applied in a variety of ways. There are the well-known forms of hot-air cabinet baths, made either for a sitting posture or for a reclining position. These baths are cabinets of wood, with well-isolated walls, the inside surface being arranged washable and so it may be disinfected. Alcohol or gas is used as fuel. They are useful for skin diseases, colds, catarrhs, gout and rheumatism, obesity, etc., and they are superior to the ordinary Turkish bath, because the head remains free and outside of the heat. Another form of application consists in hot or cold air douches, in which sprays or air currents of desired temperature are applied to the parts of the body to be treated. In one apparatus of this kind a turbine or wheel is driven by a small electric motor; the apparatus combines an electric heating device for the air, and there are two douches each with hose, for cold and hot applications. Air of a temperature up to 120° F. may be applied to the skin by the douche, assisted by massage, and sometimes alternate hot and cold air douches are applied. These are used principally in cases of muscular rheumatism or neuralgia.

Another device for hot-air applications is called "electrotherm," and consists of a box, having side openings for the hands, arms or feet. The air is warmed by electricity, and the dry application of heat is particularly soothing in cases of local pains.

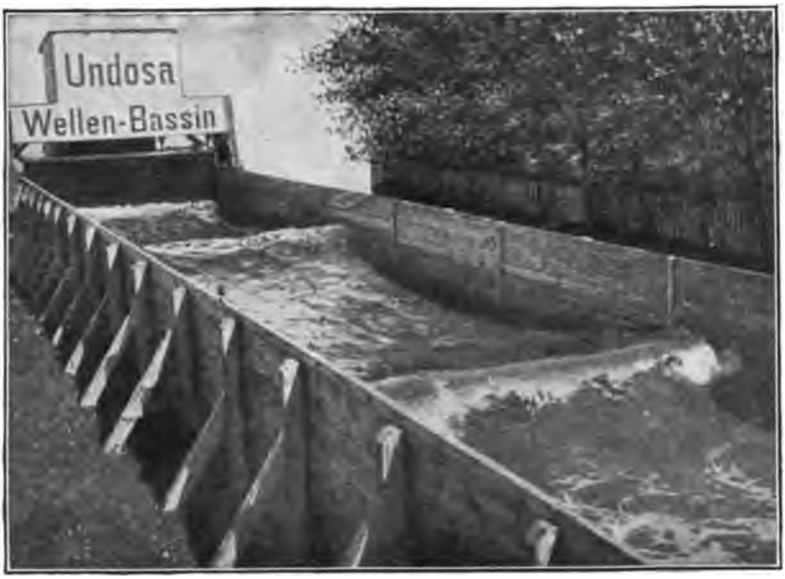

Fig. 115. View of Pool with Artificial Waves.

The "Lohtannin" baths consist of applications of the electric currents to water in which an oak-bark solution is mixed. They act favorably on the nervous system, and are useful for gout, rheumatism and ischias.

Of other more complicated electric and electro-magnetic baths I shall not speak, and I will only make brief mention of the "inhalatoria," for diseases of the respiratory organs, like those at Aix-les-Bains in France, and at Sharon Springs in New York State. Usually sulphur water is atomized either by means of steam or by compressed air and inhaled for a period varying from one-fourth to three-fourths of an hour. The applications to the throat or nose may be either dry or moist. The beneficial

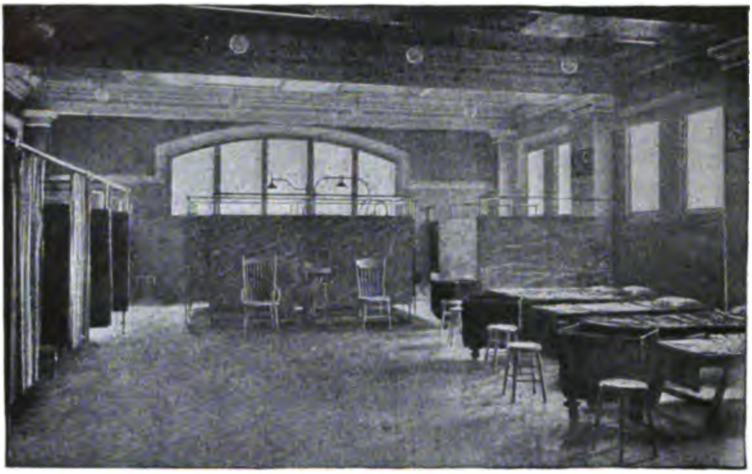

Fig. 116. View of Interior of a Mud Bath House.

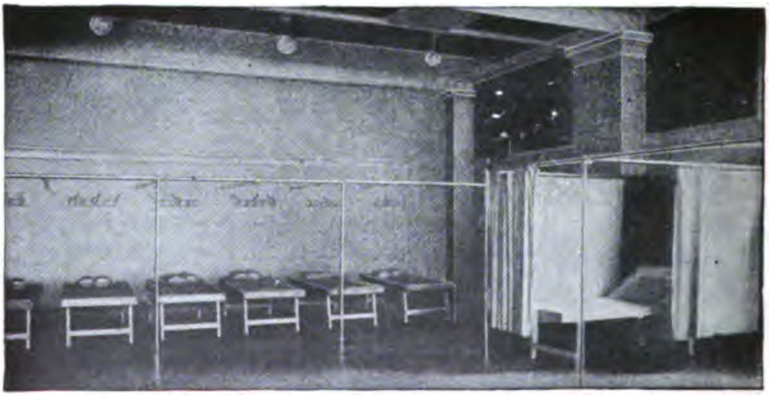

Fig. 117. View of Interior of a Mud Bath House.

effects of sulphur inhalations have been known for a long time, particularly for catarrhal affections.

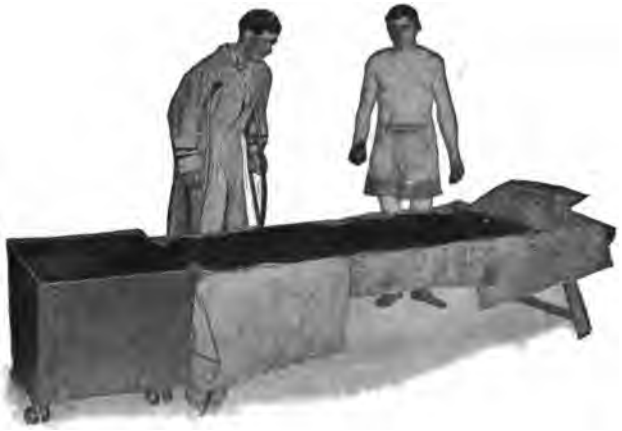

FIG. 118. MUD BATH APPLICATION.

Mud and "fango" baths are nowadays much used, particularly for rheumatic troubles and for ischias. A mud bath consists of the application to the body of warm or hot mud, usually mixed with sulphur or other water. Such mud baths exist at

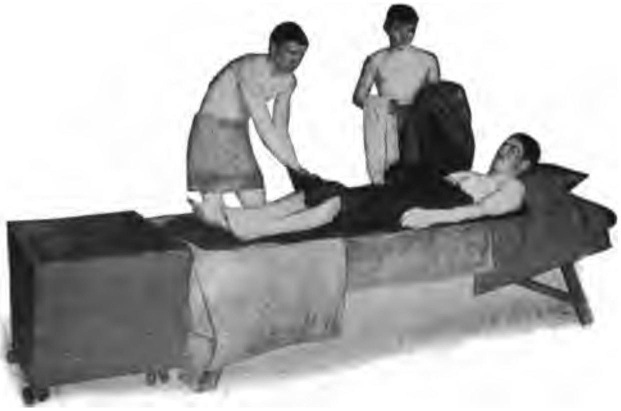

FIG. 119. MUD BATH APPLICATION.

Relief Hot Springs, Cal., where the Indians used them first to relieve rheumatism. The mud is formed of roots growing in swampy ground, and it is used in cemented tubs, into which sulphur water flows.

"Fango" is a volcanic mud product, found in Italy in the province of Padua. The Romans had fango baths at Battaglia, which were built by the Emperors. The fango mud is a grayish-brown mass, homogeneous, soft and without any odor. The illustrations, Figs. 116–120, are from the mud baths at Mudlavia, Ind. The application of this form of bath is as follows: the patient undresses, stretches out on the bed, which consists of a mattress, two woolen covers, a sheet of oil silk and a linen bed sheet. The fango or the mud is warmed to the degree prescribed by the physician and is put on the limb or the part of the body to be treated. The patient is then covered and wrapped up tightly. He remains in this position from one-half to one and a half hours, and is then taken out and douched, both to get clean and to cool off. The action of the bath is thermic, chemical and mechanical. Fango is said to hold the heat better than mud or

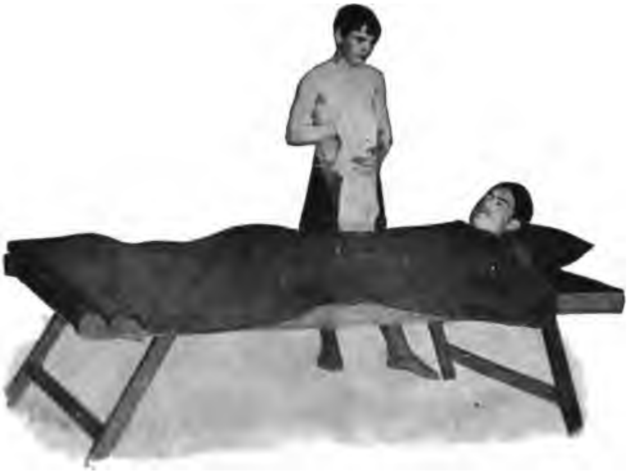

FIG. 120. MUD BATH APPLICATION.

sand, moor or linseed oil. The material is plastic like modeling clay, adapts itself well to the form of the body and adheres well. Fango is said to be rich in iron, alumina, magnesia, calcium and alkalies bound chemically to phosphorus, sulphur and carbonic acid.

It remains to speak briefly of the various kinds of electric-light baths. I think it will be conceded by many that the introduction and substitution of natural or physical healing factors, like air, heat, water, exercise and light, instead of the dosing of the human system with medicines, has been the greatest step forward taken by therapeutics in the last twenty-five years. The use of direct light rays, the so-called "Lichtheil-Verfahren," in the treatment of ailments is in many respects as unique as it is important. It was known long ago that sunlight has a beneficial influence on our system; that it promotes circulation, assimilation and increases blood circulation. Compare the pale face of the miner, working solely by artificial light in the bowels of the earth, with the ruddy face of the farmer. Pettenkofer and Koch declared that light rays kill many of the pathogenic bacteria. An old Italian proverb says, "Where the sun does not enter, the doctor must," which characterizes sufficiently the value and importance of light rays.

What the electric-light baths try to accomplish is the substitution of the efficient and healing sunlight baths. They should not be confounded with the hydro-electric baths spoken of heretofore.

It has been found that the blue, violet and ultra-violet rays are particularly active and beneficial to the nervous system.

Electric-light baths were first introduced in 1893 by Dr. Kellogg, of the Battle Creek Sanitarium in Michigan. These baths act on the system first, by the heat which they create, inducing perspiration; secondly, by the chemical and physical influence of the light rays; according to whether one or the other are more required the baths are different; sometimes artificial warmth and light are combined in the treatment.

Leaving aside the Roentgen rays application, first introduced by Dr. Finsen, in his light institute at Copenhagen, Denmark, which is a special form of treatment, there are three principal forms of apparatus for electric-light baths: (1) The incandescent-light bath (Fig. 121), consisting of an octagonal box or cabinet, about 5 feet high, lined inside with mirrors or white glass for the reflection of the rays. The box contains about fifty glow lamps, or usually eight rows of six lamps, each of 15–30 candle power and of one-half ampère strength. They are convenient to use because they exclude any danger of fire. In the center of the cabinet stands a revolving chair, on which the patient sits, the box being then closed, so that only his head protrudes. All sides of the body are exposed to the lamps and therefore heated uniformly. The bath is usually of twenty or thirty minutes' duration, at the end of which time profuse perspiration has set in. A thermometer, conveniently placed before the bather, tells him the temperature, which can be diminished by turning off some of the lights. Temperatures up to 60° C. (140° Fahr.) are taken in these baths, in some cases wet compresses being put on the bather's head. The bath acts as a tonic, strengthening, refreshing and stimulating. It is good for gout, rheumatism and obesity, and acts beneficially on the skin. After the bath a cold wet rubbing or a short full bath of 35° C. is administered, or sometimes a cool douche. Aside from the influence of the rays of the light, this bath is largely an imitation of the sunlight bath.

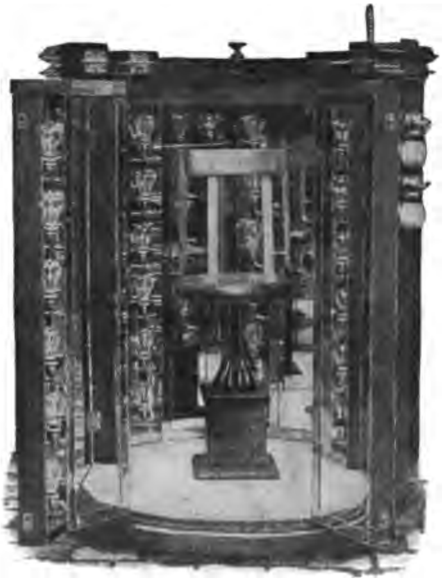

FIG. 121. ELECTRIC GLOW-LIGHT BATH.

(2) The arc-light bath. In this bath, which is similar in form to the preceding, the light used is the electric arc light. Usually the cabinet contains four lamps each of ten ampères strength. The lamps are covered up with sheets or panes of blue glass, to exclude the red or yellow rays which cause heat.

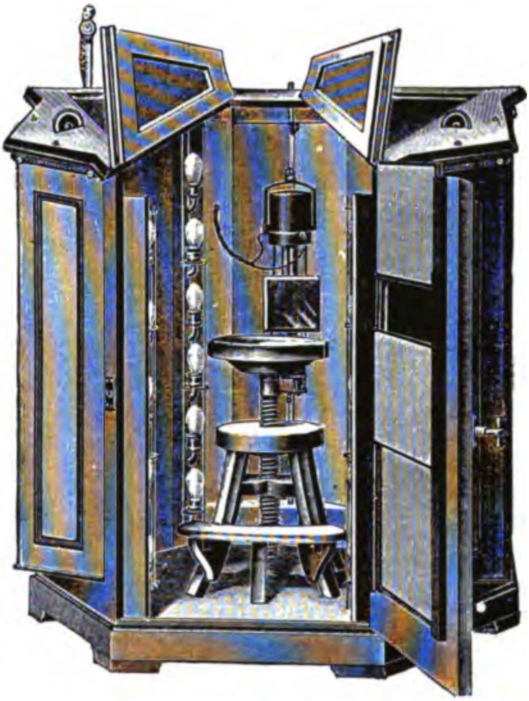

FIG. 122. ELECTRIC ARC- AND GLOW-LIGHT BATH.

The warmth is therefore much more gradually applied. The blue light acts soothingly on the nervous system; it does not weaken the patient.

(3) The third form of bath is a combination of the two preceding (Fig. 122). This is by far the best form, and is used for the treatment of neuralgia, ischias, rheumatic affections, also for skin diseases. The blue rays kill the bacteria, and some forms of skin disease are said to yield to the electric-light bath treatment.

One advantage which these forms of baths have is that they are compact, occupy but little floor space and can be used in private bathrooms, provided electric current is available. At ten cents per kilowatt a bath of twenty minutes' duration costs about eight cents.

Fig. 123 illustrates a modern European bathroom in a sanatorium, fitted up with different kinds of electric-light baths, tub baths and sprays.

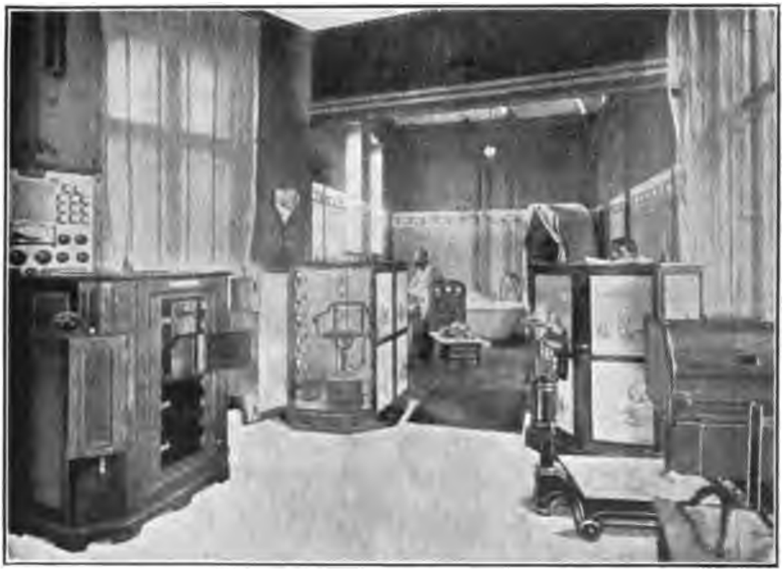

FIG. 123. VIEW OF BATH ROOM EQUIPPED WITH ELECTRIC-LIGHT BATHS.

Sanatoria and institutes containing medical baths are in many cases also equipped with mechanical orthopedic appliances for the exercise and local treatment of the muscles in various parts of the body. Many of these appliances were originally the invention of a Swede, Gustave Zander, and are, after him, called "Zander apparatus." There are two principal kinds of these, namely, those with *active* and those with *passive* movements, the latter including apparatus for mechanical massage. Among the largest manufacturers of such appliances in Europe is the firm of Rossel, Schwarz & Co., of Wiesbaden, Germany.

Exercises with such apparatus and medical gymnastics, or the so-called "Swedish movements," are generally prescribed by physicians in connection with some of the medical baths mentioned.

CHAPTER XVII

THE WATER SUPPLY AND PLUMBING OF BATH HOUSES

THE character of the supply of water for bath houses is of considerable importance. The supply should be abundant in *quantity* and suitable in *quality*. It may be derived either from the city water supply system or else from deep or artesian wells, and in rare cases from springs.

While the water used for bathing purposes does not require to be as clean and pure as drinking water, it should be free from organic contamination, from other impurities, and from disease germs. Where a city supply is used the water may be at times so turbid as not to look well in the swimming bath, or in plunges, or in the white porcelain bathtubs. Hence it must be filtered, and suitable arrangements for a local filtration of the water should be provided.

To filter the water used in the rain or spray baths does not seem necessary, and the argument used in favor of filtration, that the spray heads may otherwise stop up with fine gravel, can be met with by arranging the heads of the showers to be movable for cleaning purposes.

If the water is very hard it is not suitable for cleansing baths, as soap will not readily dissolve, and water-softening plants may then have to be installed. It must also be remembered that hard water is unsuitable for use in the steam boilers and in the apparatus used for warming the water.

As regards the quantity of water required, ample provision for an abundant supply should be made, particularly if the bath house contains swimming baths, for these require a very large supply. The minimum hourly supply should be equivalent to about one-twelfth the contents of the tank or plunge. Tub baths require somewhat less water, but in estimating the quantity needed for each bath tub allowance should be made for the water used in the cold douche at the end of the bath, and also for the additional water required for the cleansing of the tub, both of which items lead to increased consumption.

Showers or rain baths, as we have seen, require the least amount of water of any forms of baths. On the average, showers or sprays will run from three to five gallons per minute, and the water consumption to be provided will depend upon the duration of the bath. In military barracks, school baths, and in prison baths, the limit is usually five minutes, which would make the total consumption exceedingly reasonable compared with the consumption of either tub baths or swimming baths. It should also be noted that "douches," *i.e.*, showers with a solid stream, run much more water than spray heads with fine holes.

In a recent English publication it is stated that experiments on water consumption, carried out in a public bath house, showed that "slipper" or tub baths required from 50 to 70 United States gallons for each bather, whereas spray baths consumed from 12 to 15 United States gallons per bather.

A very copious and liberal supply of water should be provided to make suitable provision for the increased consumption which always takes place during protracted hot spells of weather.

If one has to depend upon a local supply from an artesian well, from which water has to be pumped, storage tanks become necessary, and it is advisable to make these very large. The water can, in that case, be stored up either in an attic or tower tank, or else in pressure tanks located in the basement.

When the supply is taken from a city or street main, it is always a safer plan to take the water from two mains, located in different streets, and to specify very large street connections or branches. The size of each service should not be less than four inches in diameter; where the pressure is low, a six-inch pipe will be better than a four-inch one.

All engineering details embraced in the water plant for a bath house must be carefully planned, studied out and specified.

While they are comparatively simple in the case of people's baths, in which only spray baths are fitted up, they become more complicated for those bath houses in which both showers and a plunge or swimming bath are installed.

The New York State law requires bath houses to be "open to the public for fourteen hours"; this leaves only a few hours in which to do the cleaning-out work connected with the swimming pool. Accordingly large supplies, large filters, large heaters and also large waste pipes are required in order to accomplish the emptying and cleaning of the pool, the filtering and heating of the water, and the refilling of the pool in a few hours.

Where the water is charged for by meter measurement the tax for water used constitutes a very heavy annual item of expense; hence where obtainable an auxiliary supply from a well is always advisable; this will also come in usefully in cases when the street mains are shut off for temporary repairs.

The hydraulic plant of a large bath house comprises service mains with shut-off valves, water meters, water filters, water heaters; also occasionally suction tanks, house pumps, attic storage tanks or else pressure tanks, together with air compressors and air tanks.

In those cases where the water pressure in the street mains is low, as, for instance, at the present time in the city of New York, tanks are required for the supply of bath fixtures situated on floors higher than the street floor; for when the bath house is much frequented and many of the sprays are running at one time, these may reduce the pressure so much that the second-floor fixtures cannot obtain their proper volume of water. Unless the tanks can be located at a suitable height above the second-floor shower-heads to give a good pressure, it will in many cases be better to install pressure tanks in the basement in which any desired pressure for the upper floors can be carried.

Where the bath house includes a pool or plunge, it is well to provide two separate supplies, one for the pool exclusively and the other for the sprays. According to the size and depth of the pool, its supply should be from four to eight inches in diameter.

The supply to the pumps should not be less than four inches. The down main from the attic tank should also be large, preferably five or six inches diameter, so as to insure a plentiful supply of water. In determining the capacity of the storage or the pressure tank, one should consider the number of fixtures supplied by the same, such as the tub baths, spray baths, the sanitary fixtures requiring flushing, the hot-water tanks or heaters, and the supply to the steam boilers.

Regarding the means for warming the water for bath purposes, a number of different methods are available, according to the quantity to be heated. For baths in private houses the water-back in the kitchen range usually performs this function, but is occasionally supplemented by gas heaters and special hot-water heaters. In large houses with many bathrooms it is considered a better and safer practice to obtain all hot water from a large hot-water tank, located in the cellar. This may be heated by high-pressure steam if available, or else it is heated by a large hot-water heater.

For public bath houses high-pressure steam is, as a rule, the means used for obtaining large volumes of hot water. This heats the water either by means of copper or brass heating coils located on the inside of large hot-water tanks, or regular feed-water heaters are employed; in rare cases water is heated by the direct admixture of steam to water; another modified way of warming the water for tubs and sprays is by means of the "Gegenstrom apparatus," the many advantages of which have already been alluded to.

The problem of warming the large volumes of water required for the swimming pools often offers perplexing difficulties. As a rule, steam is available from the heating boilers, and it may be used either by forcing live steam directly into the water of the pool, or else the cold water is heated on its way to the pool delivery pipe in special mixing pipes. The first-named method is not to be recommended; it is uncertain and noisy; the water in the pool is not heated uniformly, and there is some danger of the bathers being scalded.

Sometimes steam coils are arranged in the bottom and along the sides of the pool; but this is also not a method to be recommended, for the coils would form projections in the pool which are always undesirable.

In the case of swimming pools located in the basement of hotels or clubhouses, where a refrigerating plant is installed, the tepid clean water used in the ammonia condensers is often used for the purpose.

The usual and probably best method is to provide large heaters in which water is warmed by circulation of live steam, and to supply the pool from the heaters. If the heaters are of sufficient capacity the inflow may be continuous, and in this way the most sanitary system may be installed. It is certainly vastly superior, from the point of view of cleanliness, to the more usual system of providing a continuous circulation of the hot water from the pool into the heater and back to the pool.

When no steam is available some type of hot-water heater must be used.

* * * * * * * * *

The plumbing of a bath house should be laid out in general in the same manner as that of other buildings, and the well-known rules of house drainage should be observed. The quality of the materials used should, of course, be of the very best obtainable, in consideration of the unusually severe wear and tear to which they are necessarily subjected.

The requirements in general are: sanitary arrangement, simplicity, accessibility, durability and strength.

All the work must be sanitary in every respect, the fixtures must be safely trapped, and all pipes must be extended to the roof for ventilation. In a bath house, above all, there should not be the slightest escape of sewer air to pollute the atmosphere. The work must be arranged as simple as possible; this is desirable with a view of keeping down the cost of maintenance. All work should be accessible, in particular the various shut-off valves, the clean-outs on the traps and in the drain lines, in order to facilitate any repairs which may become necessary. But above all else, the work should be durable and strong to withstand the rough usage to which it necessarily becomes subjected, particularly in a people's bath in tenement districts, where mischievous boys abound, intent upon taking away whatever can be unfastened or torn out.

Bathtubs require extra strong and heavy fittings; they should be larger than the sizes usually used for private bathtubs, for the tubs must be filled quickly, so as not to keep the bathers waiting too long. Similarly the waste plugs and outlets as well as waste pipes should be made extra large to empty the tubs quickly.

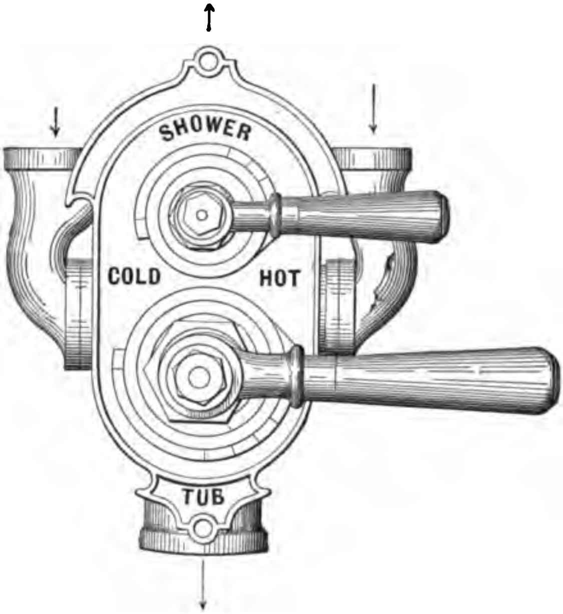

Fig. 124. Koerting Mixing Valve.

In the shower-bath compartments the fittings should be extra heavy and able to withstand rough pulling or bending. Nickel-plating of the brass work is not advisable, as the nickel would come off in a very short time. It is better to use polished yellow brass, or else the polished red metal fittings which look very well, and can be kept bright at all times.

Much care and thought should be given to the selection of a proper mixing valve for the showers. It is always best to select a non-scalding valve, by which is meant one in which cold water must be turned on first before hot water is admitted. There is a large variety of such mixing valves in the market; selection is best made after a trial of two or three kinds. The Figs. 124, 125, 126 and 127 a and b illustrate some mixing valves intended to work where hot and cold water flow under different pressures.

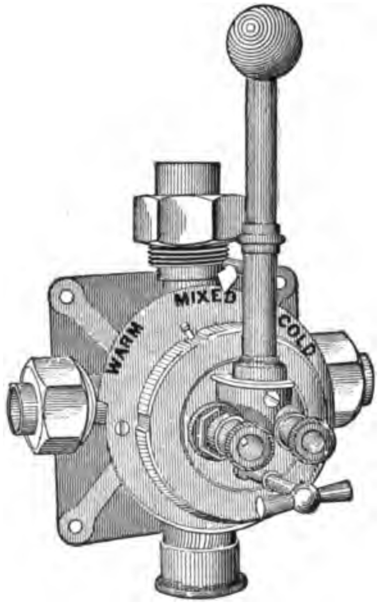

FIG. 125. A GERMAN MIXING VALVE.

The shower or spray heads must be of such size as to give a pleasant shower without wasting too much water. In many bath houses mistakes have been made in this respect, resulting in increased expense owing to the larger quantities of water which must be heated. Fig. 128 illustrates a novel form of spray much used in German bath houses and made by the well known firm of Koerting Bros. in Hannover. Another peculiar form of shower head is shown in Fig. 129, the device being intended to afford an adjustment as to the amount of water delivered by the spray per minute. It would seem to be admirably intended for the purpose.

Inasmuch as it is not usual to filter the water used for the rain or spray baths, it is advisable to have the faces of the douches removable, so as to clean out the holes from time to time or when they become stopped up with fine impurities from the water.

Floor drains are required in many places in a bath house, and to prevent the possibility of escape of sewer air, in cases where water should not pass through them for some time, it is better to use some form such as the one shown in Fig. 82 (Chapter IX), which closes much like a gate valve when not in actual service.

For the water-supply pipes of a bath house it is best to use galvanized wrought iron for the cold-water lines, and brass or copper pipes for the hot-water lines. The pipes should be kept as much as possible out of reach of the bathers; they require to be well fastened and supported. It is better to carry the main and larger supply lines at the ceiling of the basement. In this case

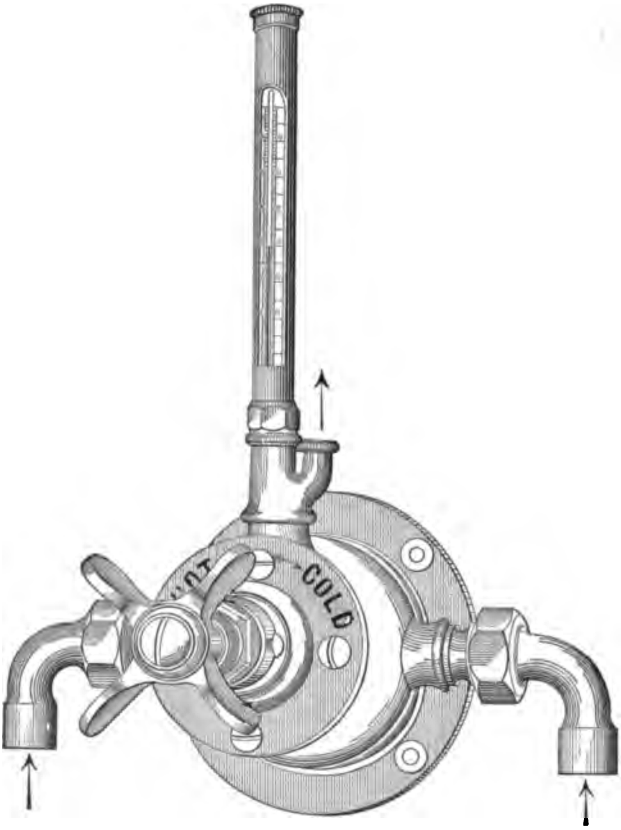

FIG. 126. ANOTHER GERMAN MIXING VALVE.

all pipes require to be wrapped with non-conducting covering, the cold-water pipes chiefly to prevent "sweating," and in some cases to prevent freezing; the hot-water pipes to prevent loss of heat. A good plan, which I have advocated for many years, and which on a recent trip to Germany I found carried out there much oftener than here, is to paint the various pipe lines in the basement with different colors to readily distinguish them. Where the pipes are covered, the covering may be painted of the color required.

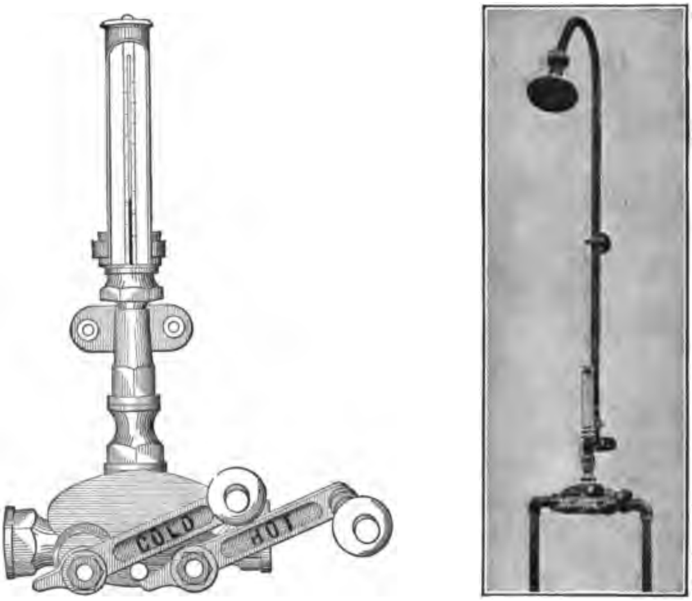

Fig. 127 a and b. Universal Mixing Valve.

The supplies should be of ample size to supply all fixtures quickly; thus, supplies to tub baths should be one inch to each tub, and the main branch for a set of tubs should be two or three inches. The supplies to showers should be three-quarter inch, branched from two or three inch sub-mains. The supply to a pool should be from 4 to 8 inches in diameter according to its size; all shut-offs on supply lines should be full water way *gate valves*, and *not* globe valves or lever-handle stopcocks.

The waste pipes should likewise be generous in size; wastes from shower or spray baths should be three inches, so that the water will run off fast; wastes from tub baths should be not less than two inches, and the mains should be three and four inches.

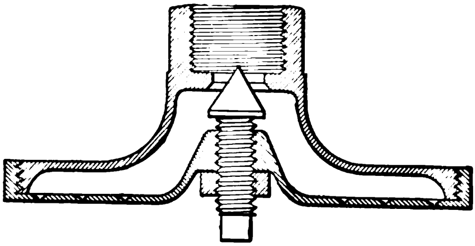

FIG. 128. ADJUSTABLE SHOWER HEAD.

The waste or emptying pipe for the pool should be 10 to 12 inches, or sometimes two 6 or 8 inch waste pipes are arranged. The overflow from the pool should be from four to six inches, and there should be at least two of these.

In the following I give an abstract from a plumbing specification for a large city bath house, fitted up with tubs, sprays and two swimming pools; and I have added the paragraphs from the general building specification relating to the waterproofing, concreting, tile and marble work for the baths; also the requirements relating to the heating of the bath water, taken from the steam-heating specifications. Many details of arrangement, which I have discussed above but briefly, are explained by the specifications.

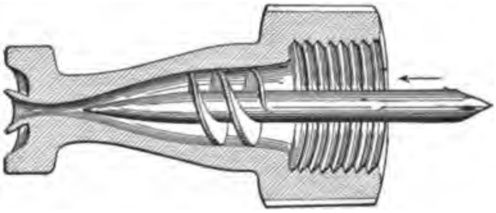

FIG. 126. KOERTING BATH SPRAY.

SPECIFICATION FOR MUNICIPAL BATH HOUSE

GENERAL CONDITIONS

§ 1. *Digging and Filling In.*

All necessary excavation, whether same is earth, rock or other material, and all refilling of trenches required in connection with the plumbing and gas piping, shall be included in the estimate for the plumbing, and the plumber shall arrange with the building contractor or his excavator to have the work done.

§ 2. *Sewer, Water and Gas Services.*

The plumber shall provide the required sewer, water and gas services and bring all pipes to a point just inside of the inner face of the foundation walls, and make the required inside connections for his work at these points.

§ 3. *Sewer Connections.*

There shall be two 12-inch sewer connections. One of these to be with the public sewer in ——— Street and the other with the public sewer in ——— Street. The sewer connections shall be made with extra heavy cast-iron pipe with leaded and calked joints. Wherever the soil in the trench is such as to require special supports for the pipes, these shall be provided for under this contract and without extra charge, the same to consist either of a bed of hydraulic concrete or of saddle piles, as the architects may direct. The sewer connections shall be brought to the inner face of the foundation walls at the points shown on the drainage plan.

§ 4. *Water Connections.*

The plumber shall provide two 4-inch water-supply branches, one to come from the 12-inch water main in Avenue ———, the other to come from the water main in ——— Street. In case no water mains should be available in the two streets mentioned, the City will provide suitable water-supply mains at the two points in the streets as shown on plan. Each water connection shall be provided near the main with a 4-inch gate valve and with a looped connection to provide against breakage of the service by settlement. The two water-supply services, each 4 inches in diameter, shall be run into the building where indicated on the water-supply plan, and all inside connections shall be made at these points.

§ 5. *Gas Connection.*

The plumber shall secure from the gas company supplying this district a 2-inch service main of plain black wrought-iron pipe and run the same to the building at the point designated on the plans, and leave the same properly capped inside of the foundation walls.

§ 6. *Cutting of Walls and Floors.*

The building contractor will provide all underground pipe channels, also all holes and recesses or pipe channels shown on the plans, and any additional holes or chases required for the work. He will also do any cutting of walls, floors, partitions, etc., which the plumber may require. Where the pipes cross masonry they shall be encased in heavy iron pipe sleeves, which the plumber is to furnish for the mason to build in.

§ 7. *Assistance of other Trades.*

The building contractor will provide all required wooden boards or strips for the plumbing work. He will also build all brick piers, which may be required to support plumbing pipes, likewise all cesspools for surface water drainage, and also all manholes about clean-outs, traps, etc.

The steamfitter will provide the four (4) hot-water tanks specified under his work, also all necessary steam and return connections and blow-off pipes for the same. The plumber shall provide all cold-water, hot-water and circulating pipes and connections for these tanks.

The building contractor will do all cleaning, painting or bronzing of all exposed pipes.

TESTS OF THE WORK

§ 8. *Test of Sewers.*

The plumber shall test the two sewer connections under a hydrostatic pressure of at least thirty pounds per square inch and make all joints tight.

§ 9. *Test of Water Connections.*

The plumber shall test the two 4-inch water services under hydrostatic pressure of 100 pounds per square inch.

§ 10. *Test of Gas Connections.*

The gas service run by the company from the street main into the building shall be tested under an air pressure equivalent to a column of mercury 20 inches high. This test may be done by the gas company, but if they do not put on the test the plumber shall be required to make it.

§ 11. *Tests of the Inside Sewer, Soil, Drain, Waste, Leader and Vent Pipe System.*

The plumber shall test the entire inside sewer-pipe system, including all vent pipes, and including the roughing for the fixtures by a water-pressure test in the manner as required by the Building Department.

§ 12. *Test of the Supply Pipes.*

The plumber shall test all inside supply pipes after these are put in position, including all branches and valves, under a hydrostatic pressure of 100 pounds per square inch.

§ 13. *Test of the Gas Piping.*

The entire gas piping of the building shall be tested after its completion and before plastering is commenced under an air pressure equivalent to a column of mercury 20 inches high.

§ 14. *Test of the Filters.*

The plumber shall, under the direction of the architects, apply a capacity test to the filters and demonstrate to their satisfaction that they furnish the guaranteed supply of water per minute.

§ 15. *Final Test of the Plumbing Work.*

After completion the entire plumbing work shall be tested by the plumber with a smoke testing machine and oil of peppermint combined, as required by the rules of the Building Department. The plumber shall send proper notices three (3) days in advance of such tests to the architects' office, and he shall afford all proper facilities for the tests. He shall also properly notify the Building Department of all tests which the Department may require. He shall remove and repair all defects which any of these tests may show. He shall regulate all flushing cisterns and their ball cocks so as to work noiselessly and without splashing. He shall also regulate all faucets, valves and the mixing valves for the showers.

§ 16. *Plumbing Regulations.*

The plumbing regulations of the Building Department of the Borough of Manhattan shall be complied with in every respect, and the plumber shall be held responsible for any violation of the same, whether caused by omission in the drawings or specifications, or by omission or neglect of his mechanics.

MATERIALS

§ 17. *General Clauses.*

All materials used under this contract shall conform in quality with those required by the revised rules of the Building Department of New York City. The plumber shall make any test of the materials which may be called for by the architects, at his own cost, and under the architects' direction and supervision.

§ 18. *Cast-iron House Drains and Sewers.*

The house sewers from a point where they connect with the public sewer to front wall of building, and any portions of the house drains within the building which are located below the basement floor, including fresh-air inlets, area and leader connections, shall be of extra heavy cast-iron pipe of the best make. All joints shall be made with oakum and pure pig bar lead.

§ 19. *Iron Frames and Covers.*

The plumber shall provide all the necessary iron frames and covers over traps, clean-outs, valves, etc., located below the floor. The size of these shall be sufficient to give proper access to the clean-outs or the valves, and not less than 24 inches in diameter.

§ 20. *Wrought-iron Soil, Waste and Vent Pipes.*

All vertical soil, waste and vent pipes, and all parts of the horizontal house drains which are not under ground shall be of standard galvanized wrought-iron pipe of sizes as shown on plans and in sections. All fittings for soil and waste pipes shall be the recessed galvanized cast-iron drainage fittings. Fittings for vent pipes shall be heavy galvanized steam fittings with shoulders. Tee-Y branches may be used on vertical lines, but shall not be used in horizontal work.

§ 21. *Branch Waste and Vent Pipes.*

All branch waste and vent pipes, except those exposed at fixtures, shall be of galvanized wrought iron, of sizes as called for on plans. The exposed branch waste and vent pipes at fixtures shall be of polished brass.

§ 22. *Supply Pipes.*

All main lines of hot and cold supply pipes throughout the building shall be run with standard galvanized wrought-iron pipe. All fittings shall be galvanized and have beads or shoulders. All joints shall be screw joints. All pipe supports, hangers, clamps and holdfasts shall be of galvanized iron.

§ 23. *Supply Pipes at Fixtures.*

At all fixtures throughout the building the exposed supply pipes shall be of polished brass, this to include the valves and air chambers where exposed, as well as the hangers, clamps or holdfasts.

§ 24. *Stopcocks or Globe Valves.*

No ordinary lever handle or compression stopcocks or globe valves shall be used in this work.

§ 25. *Valves.*

All valves shall be best quality polished brass gate valves of the Chapman Valve Manufacturing Company's make, or other make equal in quality if approved by the architects. Valves below basement floor shall be unfinished brass valves made accessible by the plumber by means of valve boxes. All fixtures in the building shall have separate shut-offs on both the hot and cold water; this shall also include all flushing cisterns.

§ 26. *Lead Pipe.*

No lead pipe shall be used in this work, except lead bends for water-closets and slop sinks, which shall be of standard weight. All waste and supply connections shall be of galvanized wrought iron as far as not exposed, and of polished brass wherever exposed at the fixture.

§ 27. *Brass Pipe.*

All brass pipe used for the exposed piping at the fixtures shall be polished annealed, drawn brass pipe, of iron gauge. All pipe at slop sinks and other places where water may be drawn for drinking purposes shall be tinned on the inside.

§ 28. *Air Chambers.*

The plumber shall provide the proper sized air chambers to the supplies to all fixtures.

§ 29. *Supplies to Heating Apparatus.*

The plumber shall provide the necessary 2½-inch cold-water supply pipes for the heating boilers and make all connections to boilers with proper shut-off gate valves.

§ 30. *Pipe Covering.*

The plumber shall supply and put up the best quality 85 per cent magnesia non-conducting covering, approved by the architects, to all the cold and hot supply pipes exposed throughout the building.

§ 31. *Finish of Fixtures.*

The finish of piping at all plumbing fixtures shall be of polished brass.

§ 32. *Traps.*

Each two showers shall have a 3-inch brass trap with polished brass cleaning screw, set flush in the floor, and with 3-inch vent. Each bathtub to be trapped by a 2-inch extra heavy lead trap with 1½-inch vent. All traps shall be smooth inside but rough outside. For each of the two groups of 6-inch emptying lines for each swimming pool and for the overflows from pool connected thereto, set an 8-inch heavy iron trap, made of fittings and with a water seal of 12 inches depth.

§ 33. *Floor Drains and Hose Cocks.*

Wherever shown on plans, the plumber shall provide and fit up brass "Perfectum" floor drains, with gate valve, as made by the Henry Huber Manufacturing Company, or other equally good floor drains, if approved by the architects. All floor drains to have strainers, 3-inch outlets and 3-inch traps without vents. For each floor drain provide a ¾-inch galvanized iron cold-water supply and hose cock of polished brass.

§ 34. *Samples.*

The plumber shall submit samples of the materials or fittings intended to be used in this work wherever called for by the architects for their approval. All materials shall be equal in every respect to that of the samples approved and selected by the architects.

§ 35. *Protection of Work.*

All traps in floors, floor drains, etc., shall be protected so as to prevent cement and lime filling the same; all such material shall be carefully removed from traps, etc., and all cutting and repairing of floors in connection with this work shall be done by the contractor without extra charge.

DESCRIPTION OF FIXTURES

§ 36. *Setting of Fixtures.*

The plumber shall furnish and set all fixtures included in these plans and specifications. All connections at fixtures shall be made in a neat, finished and uniform manner. The setting of fixtures shall not be commenced until directed by the architects.

§ 37. *Water-Closets for Public Use.*
§ 38. *Urinals.*
} Description of these is purposely omitted here.

§ 39. *Shower Baths.*

The plumber shall furnish and fit up complete in each shower-bath compartment one of Peck's, Mott's, Meyer-Sniffen Company's or Henry Huber Company's inclined douche and rain bath, without thermometer, but with approved form of mixing valve. Same shall be made entirely of polished brass, and only the handle and bonnet part of the mixing valve shall be exposed to view. Valve and handles to be extra heavy and made specially durable. For the outlet pipes in each shower-bath compartment provide and set a 5-inch polished brass strainer of approved make, with removable screw top. For each two adjacent shower baths, as shown on plans and in detail, provide 3-inch brass trap with cleaning plug, also 3-inch waste connection of iron to main drain in cellar. Provide ½-inch hot and cold supplies to each mixing valve.

§ 40. *Bathtubs.*

Furnish and set complete, where shown on plans, enameled cast-iron roll-rim tubs of the Standard Manufacturing Company's, or other equally approved, tubs. Length to be 5 feet 6 inches. Tubs to be of a pattern with 3-inch wide roll rim, rim at end of tub to be 4 inches. Fit up tubs with polished brass connected overflow and waste, and with supplies to floor, and wheel handle fittings set on top of the roll rim. Supply tubs with hot and cold water through ¾-inch supply pipes. Waste through 2-inch lead waste, 2-inch lead trap and 1½-inch vent. Tubs to be set on cast-iron painted feet with ball or claw foot.

§ 41. *Engineer's Sink.*

Furnish and fit up in cellar, where shown on plans, one galvanized-iron sink, with galvanized-iron back, set on galvanized-iron brackets. Size of sink to be 20 inches by 30 inches. Waste through 2-inch lead waste, 2-inch lead trap and 1½-inch vent. Supply sink with hot and cold water through ¾-inch supplies and polished brass sink bibbs, compression pattern.

§ 42. *Slop Sinks.* (Description purposely omitted.)

§ 43. *Water Meters.*

The plumber shall furnish and fit up on the two water-supply mains, at the place located on the plans, two 4-inch water meters, the same to be either the Thompson or the Neptune water meters, of type acceptable to the Water Department. Each meter shall be set on strong wrought-iron supports, and with the meters provide fish traps, check valves and gate valves, all to be 4 inches in size.

§ 44. *Water Filters.*

The plumber shall furnish and fit up two double-cylinder improved water filters, to be either the Loomis-Manning filters or other filters equally good, if approved by the architects. The filters to have a capacity each of 150 gallons per minute under the available Croton pressure. All the necessary piping at the filters shall be provided for, and it shall be of galvanized iron throughout. Each filter to be provided with waste pipe and with sight glass, also with the required operating levers and the four way-valves of brass. When completed each filter shall be painted three coats of white enameled paint. The plumber to make all necessary connections from the water service mains to the filters, also provide 4-inch by-pass. It shall be understood that filtered water will be required only at the two swimming pools and at the steam boilers, and all the water supplied to the shower baths and to the bathtubs, as well as the water-closets and other fixtures, shall be unfiltered water as described further on under "Arrangement of the Water Supply."

§ 45. *Hot-Water Tanks.*

The four hot-water tanks shown on the plans of the basement shall be furnished by the steamfitter, who shall also make all the required steam connections, and who shall provide the non-conducting materials for the tanks. The plumber shall provide all the required cold-water supply connections to these tanks. Each supply to be 4 inches for the two heaters for the swimming pools and 3 inches for the two heaters for the showers. The plumber shall also connect all his hot-water and circulation lines to these tanks. He shall also provide the required emptying pipes and emptying valves for these tanks. He shall cross-connect the two tanks for the swimming pool so that they may be operated together. He shall also cross-connect the two tanks for the shower baths, and all the required valves, pipes and fittings for these connections and cross connections shall be provided by the plumber.

§ 46. *Drinking-Water Filter.*

For the drinking fountain located in front and outside of the building the plumber shall furnish and fit up a large-size Berkefeld, or other equally good, porcelain cylinder germ-proof filter, the same to have a capacity of 10 gallons per minute under 40 pounds water pressure. He shall run a ¾-inch supply pipe from the service main to this filter, make all valve connections to the same, and run from the filter a ¾-inch galvanized-iron supply pipe to the drinking fountain. This pipe shall be provided with a stop and waste valve in the basement so that the same can be entirely shut off and emptied in winter time.

§ 47. *Supplies to Heating Apparatus.*

From the filtered service line the plumber shall provide and connect a 2½-inch supply pipe of galvanized iron to the steam-heating boilers and provide all the necessary valves for the same. He shall also supply any steam boiler injectors if such are called for.

§ 48. *Sill-Cocks.*

For each floor drain the plumber shall furnish and fit up a polished brass ¾-inch sill-cock, of pattern acceptable to the architects.

§ 49. *Outside Sill-Cocks.*

The plumber shall furnish and fit up all the outside sill-cocks shown on the plans, the same to be supplied with water from service branches taken from inside of the meter, and each to be provided with stop and waste valve, so that they can be emptied and drained in winter time.

§ 50. *Fire Lines.*

The plumber shall furnish and fit up three fire standpipes on the first floor, the same to be taken from the unfiltered water service mains. The standpipes to be located where shown on plans, to be 2½ inches in diameter and to be provided with 2½-inch outlet. At each standpipe provide a 2½-inch fire valve of polished brass of the Chapman Valve Manufacturing Company's make; also attach at each fire valve a white enameled hose reel or hose rack, of pattern as may be approved by the architects, and with each fire hose furnish 100 feet of rubber-lined 2½-inch cotton hose, the same to be of the Underwriter pattern, warranted to be safe under a bursting pressure of 400 pounds per square inch. Each fire hose to be provided with polished brass fire nozzle.

SCHEDULE OF PLUMBING FIXTURES

§ 51. *In Basement.*

Two (2) water meters.
Four (4) hot-water heaters (connections only to be made by the plumber).
Two (2) double-cylinder filters.
Two (2) water-closets.
One (1) engineer's sink.
One (1) drinking-water filter.

First Floor.

Thirteen (13) water-closets.
Six (6) urinals.
Two (2) slop sinks.
Eight (8) bathtubs.
One hundred and seventeen (117) shower baths.[1]

ARRANGEMENT OF THE WATER SUPPLY

§ 52. *Cold-Water Supply.*

Main No. 1. — From water-main in Avenue ——— take a 4-inch supply, with gate valve and expansion loop on same, and run to inside of west wall of building at point shown on plans. Place gate valve, fish trap, water meter, check valve and another gate valve in order named and run across basement ceiling, avoiding steam-heating ducts, to filter room at east end of building. Run from this line a ¾-inch supply to drinking fountain on west side of building, connect line to Berkefeld water filter specified, and provide shut-off and waste or drip valve. Take from supply-main No. 1, outside of filter, a 4-inch line, with two 3-inch branches, one to hot-water heater, marked "C–1" on plan, and the other as a continuous loop supply for men's showers. Connect the east end of 4-inch main to filter marked "A–1" on plan with a 4-inch valved cross connection to filter marked "A–2," to run along ceiling.

Main No. 2. — From water-main in ——— Street take a 4-inch supply, with gate valve and expansion loop on same, run to inside of south wall of building at point shown on plans. Place gate valve, fish trap, water meter, check valve and another gate valve in order named and connect 4-inch line to filter "A–2." From this main, before it goes to filter, run a 4-inch line with two 3-inch branches, one to hot-water heater "C–2," for women's shower baths, and the other as a continuous 3-inch cold supply loop to women's showers; all these pipes to be run on ceiling.

Run a 4-inch line from filter "A–1," with a 4-inch branch to hot-water heater "B–1," for men's swimming pool, and another direct filtered 4-inch cold-water branch to east end of men's swimming pool. This latter line shall be run to top of swimming pool and shall be connected with a branch from the 4-inch hot supply line. Both lines are to be valved, the valves setting in a brick pit under the floor and connected together, so that hot, cold or mixed water can be discharged over the pool. Run a 1½-inch supply from the 4-inch unfiltered main No. 1 to fixtures in men's toilet on first floor, and a 1½-inch supply from 4-inch main No. 2 to fixtures in women's toilet on first floor.

Filter "A–2" will have branch lines running from same, connected up similar to those from filter "A–1," but supplying hot-water heater "B–2" for women's swimming pool, and another direct filtered 4-inch cold-water line at east end of women's pool.

Cross connect the two 4-inch supplies that run to the heaters "B–1" and "B–2" for the two swimming pools, as shown on plan.

Provide six ¾-inch outside sill-cocks, properly valved and dripped, connected to the nearest unfiltered lines and located as shown on water supply plan; also provide hose cocks with ¾-inch supplies near the floor drains in waiting-rooms, toilet-rooms and bathrooms.

A 2½-inch line, to supply boilers, will be run from filter "A–2."

§ 53. *Hot and Cold Supplies to Showers.*

All ½-inch hot and cold supply branches for showers and the ¾-inch branches for bathtubs shall be taken, not from the main water supply loop lines shown on water supply plan, but from 1½-inch sub-mains connected with the loop lines. Of these there shall be ten (10) lines in the men's baths and six (6) lines in the women's baths, and each of the sub-mains for hot and cold water shall be arranged with full-sized shut-off gate valves, so placed as to enable the bath attendants to shut off the bath compartments in sections without going to the cellar. The sub-mains, starting with 1½-inch pipes, may be reduced as branches are taken off, until the end of the line for the last shower is ½-inch in size.

§ 54. *Fire Lines.*

Provide to first floor only three 2½-inch fire lines, connected to the nearest unfiltered line and run as shown on water supply plan.

§ 55. *Hot-Water Supply.*

The two hot-water heaters "B–1" and "B–2" for swimming pools shall be valved and cross connected, as shown, and separate 4-inch lines shall be run from each of the heaters to the two pools. These two 4-inch lines shall enter at the bottom of each of the pools, a 4-inch hot-water branch shall be run to top of pool and be connected to cold supply as described under "Cold-Water Supply."

Two 3-inch hot supplies shall be taken from the top of the hot-water heater "C–1" for the men's showers and shall be connected to form a continuous loop and return to the bottom of the heater. Supplies shall be taken out of this loop for the outside showers. A 3-inch return shall be run from the loop back to the heater and from this return 1½-inch branches shall be taken for the showers in the center of the room. Provide check valve on this line before it returns into the heater.

The hot-water heater "C–2" for women's showers will have a 3-inch hot supply run from top of heater and run in the form of a continuous loop returning to bottom of heater. All hot supplies for the showers shall be taken from this loop.

Run a ¾-inch hot supply from hot-water heater "C–1" to slop sink in men's toilet-room, first floor. Run a ¾-inch hot supply from heater "C–2" in a similar manner to slop sink, in women's toilet, first floor.

ARRANGEMENT OF THE DRAINAGE

§ 56. *Sewer Connections.*

There will be two sewer connections. The plumber shall pay for the permit for the opening the streets, provide the required 12-inch spurs or branches in the street sewers at points designated on the plans, do all trenching, excavating, whether earth or rock, and run the two lines of 12-inch sewers into the building. He shall also do all refilling of trenches for his pipes. For material for the two sewer lines, see under "Sewer Connections."

§ 57. *North Sewer.*

The north sewer shall make connection with the street sewer in ——— Street. It shall be 12-inch inside diameter. It shall be provided with a 12-inch house trap, and with an 8-inch fresh-air inlet. Outside of the house trap provide on this sewer a 12-inch by 3-inch Y branch for a boiler blow-off pipe, and run this pipe to inside of building, at which point the steamfitter shall connect. Provide an 8-inch branch running in a westerly direction, which branch shall take all waste pipes from the men's baths, also two outside 4-inch leaders, two inside 5-inch leaders, and seven 3-inch floor drains.

Provide another 8-inch branch running south, which shall take the two waste and four overflow pipes from the men's swimming bath, and which shall also have 3-inch emptying pipe for the hot-water tank "C–1," as shown, and four 3-inch floor drains.

Provide a third 6-inch branch which will take the drain pipes from the men's toilet-room, one 3-inch outside leader, also the engineer's toilet water-closets and sink, also one outside 4-inch leader at east end of building, and a 3-inch emptying pipe from the hot-water tanks "B–1" and "B–2," and two 3-inch floor drains.

The 12-inch main house sewer shall be located below the floor, likewise the 8-inch branch for the swimming bath, and the 6-inch branch for the basement water-closets. All pipes for the wastes from the shower baths and bathtubs shall be carried at the ceiling of the cellar, and shall be so located and run that they will not interfere with the heating and vent ducts.

For the main male toilet-room set one 5-inch vent pipe extending up through the highest roof. This main vent shall have all the required branches for the venting of the basement and first-floor toilet-room fixtures, as shown on the plans and in the sections. The plumber shall also provide the required vent lines for the traps of the bathtubs and shower baths, all as per plans and sections.

58. *South Sewer.*

This sewer shall make connection with the sewer in ——— Street. It shall be 12 inches in diameter. It shall be provided with a 12-inch house trap, and with an 8-inch fresh-air inlet. This house sewer shall have four principal branches, two to be 8 inches in diameter, and two 6 inches. One 8-inch branch shall be for all the wastes from bathtubs and showers from the women's bath, one floor drain, one 2-inch waste and overflow from outside fountain on west wall, also for two 4-inch outside and two 5-inch inside leaders. The other 8-inch branch shall be for two waste and four overflow pipes from the women's swimming bath, and for the 3-inch emptying pipe for hot-water heater " C-2," and four 3-inch floor drains.

One 6-inch line shall be for the waste from the women's toilet room the other 6-inch line shall take in a 3-inch outside leader and one 3-inch floor drain and run up to the ceiling, and extend to the east end of the building, there to receive the waste from one outside 4-inch leader, and the emptying pipes from the two large filters " A-1 " and "A-2."

On this sewer line the plumber shall set one 5-inch main vent pipe for the women's toilet-room fixtures, with all the required branch vent lines for the fixtures. The plumber shall also provide and run all the required vent lines for the bathtub and shower bath traps, as shown in plans and sections.

All lines of vent pipes shall be carried up as straight as possible to the roof but all necessary offsets shall be provided by the plumber. All pipes shall terminate at the roof at such a height as the architects shall direct.

§ 59. *The Sizes of Branches to fixtures* shall be as follows:

For each water-closet	4-inch
For each slop sink	3 "
For every two shower baths	3 "
For each bathtub	2 "
For each urinal	2 "
For each sink	2 "
For each basin	2 "
For each floor drain	3 "
For each swimming-bath emptying pipe	6 "
For each overflow branch pipe for the gutter near the top of swimming pool	6 "
For each inside leader	5 "
For each outside leader	3-inch and 4 "
For drinking fountain waste and overflow	2 "

There shall be one line of 4-inch soil pipe, one line of 2-inch waste pipe two lines of 5-inch soil and waste, two lines of 4-inch vent pipes and eleven lines of 3-inch vent pipes, each line to have all the required and necessary branches.

§ 60. *Arrangement of the Gas Piping.*

The building shall be piped for gas, as indicated on the drawings, according to the rules of the gas company. The plumber shall provide a 2-inch service pipe and shall do the entire piping inside with plain black wrought-iron (not steel) gas pipes, and with galvanized malleable fittings with beads. All joints shall be screw joints, made permanently gas tight without the use of gas-fitters' cement and without filling the pipes with water. The plumber shall provide all the gas outlets shown on the architects' plans. All gas risers and distributing pipes shall be of ample and sufficient size to supply the lights indicated on plans. No pipe shall be smaller than ⅜-inch in diameter. A separate 1-inch gas riser shall be run from the gas meter to the janitor's kitchen, and outlets shall be there provided, with shut-off valve, both for the gas range and for the gas water heater. All gas pipes shall be run with a pitch back toward the riser and gas meter. For height of side lights consult the architects' office. All drop pipes shall be perfectly plumb and all nipples shall be of the proper length for putting on the fixtures without marring the plastering. The completed gas piping shall be tested by the plumber with an air pump and mercury gauge under pressure of 20 inches. The gauge shall stand for an hour without indicating a fall greater than ½ inch. All gas leaks and defects in the piping shall be made good by the plumber. The plumber shall see that the gas company brings in the gas service at the proper point designated by the architects. Gas pipes to be run inside of brass frames for showers where outlets are indicated.

§ 61. *Patents.*

The plumber shall and does hereby guarantee that any plumbing work installed or plumbing material used does not infringe upon any patents, and in the event of patents having been issued covering any material used by the plumber and claimed by the patentee as an infringement the plumber shall obtain from the patentee a statement, in writing, giving him the privilege of using such material, and he shall further agree to pay any royalties claimed by the patentee, and also to hold the City of New York harmless in the event of any patent litigation.

§ 62. *Hot-Water Service Tanks.*

For heating the water for the showers, furnish and set up with all required supports, two Davis hot-water service heaters, or equal and approved, each to be 45 inches in diameter by 156 inches long, and of sufficient capacity to raise the temperature of 5,500 gallons of water per hour from 40° Fahr. to 120° Fahr. with steam at 5 lbs. pressure.

For heating the water of the plunge tanks, furnish and set two (2) I. B. Davis, or equal and approved hot-water service heaters, one 38 inches in diameter by 108 inches long, and one 29 inches in diameter by 105 inches long. These heaters to be of sufficient capacity to raise the temperature of 6,000 and 4,000 gallons respectively in one hour from 40° Fahr. to 80° Fahr. with steam at 5 lbs. pressure.

The shells of all these heaters shall be built of the best boiler steel 7-16 inches thick with 7-16-inch heads; the effective heating surface, consisting of seamless drawn, brass tubing, tested to 500 lbs. inside pressure before being used. Leave all necessary inlets and outlets in the heater for water, steam, and blow-off, drip, thermometers, and thermostat connections, each heater to have three handholes, plates and accessories. All connections except water connections to be made by the steamfitter. When completed the heater shall be tested, and proven tight under hydraulic pressure of 150 lbs. before leaving the shop.

§ 63. *Temperature-Regulating Apparatus.*

For each of the hot-water tanks supplying the swimming pools, there will be two thermostats which will control the diaphragm valves placed upon the main pipes and upon by-passes to same.

There will also be furnished for the two hot-water tanks used for shower baths two thermostats for each tank, controlling diaphragm valves in a similar manner.

§ 64. *Non-Conducting Covering.*

Furnish material, and cover the hot-water service tanks with asbestos blocks 1½ inches thick, outside of which will be applied half inch of plaster and the whole covered with canvas.

§ 65. *Concrete Work for Swimming Pools.*

Erect the necessary planking and fill in between and at back and front of vertical and horizontal steel beams, and between and around steel floor beams, forming walls and floors of swimming pools, with concrete composed of one part Atlas Portland cement or other brand equally acceptable to the architects; 2 parts clean sharp grit sand, and five (5) parts of hard trap rock or granite, broken to a size to pass through a 1-inch ring; concrete to be well rammed and grouted.

§ 66. *Concrete Work for Shower-Bath Compartments.*

Cover the floor immediately under each dressing and shower-bath compartment with concrete composed of one (1) part approved Portland cement, two (2) parts clean sharp grit sand and six (6) parts of gravel. dished and countersunk as indicated on detail drawing, top coating to be of granolithic composed of one (1) part of fine gravel, laid smooth and even throughout and rounded on internal and external angles and set to form a curved base to receive marble lining and partitions. Flooring in dressing compartments to be laid with a slight pitch toward shower floor drains; all of this work shall be done before marble partitions are set.

§ 67. *Concrete Preparation for Finished Flooring and Sleepers.*

It is intended that finished flooring for all floors and for swimming pools shall include the concrete preparation for same from the level of the top of the fireproof floor construction. Over the finished waterproofing lay a bed of concrete to receive finished flooring, composed of one (1) part of approved Portland cement, two (2) parts sand, and six (6) parts of gravel, on top of this concrete lay the finished flooring with bed for same. Build into the concrete flooring forming bottom of both swimming pools a continuous binder composed of No. 18 gauge expanded metal, coated with asphalt, lapped 3 inches and thoroughly wired together.

§ 68. *Special Waterproofing in Connection with Pipes.*

Waterproofing in connection with pipe thimbles passing through walls and in connection with shower bath drainage and supply pipes, etc.; and all steam pipes, electric conduits, etc., to be done in a specially careful manner with sheet lead soldered on to pipes, the method of all such work to be submitted to the architects for approval before doing the work.

§ 69. *Waterproofing of Swimming Pools.*

The swimming pools shall be entirely waterproofed with six layers of felt, each layer solidly cemented together and covered on top with coal tar pitch, connect this waterproofing in the floors of the rooms. The contractor shall use every precaution in this work (with a view to the strict requirements of his guarantee) to make the pools absolutely water-tight, especial care shall be taken in making waterproofing water-tight around pipe connections into the pools, the method of this construction to be submitted to the architects for approval before the execution of the work.

The entire concrete floors and walls of the pools shall be heavily coated with hot asphaltic cement before laying the felt, and the waterproofing shall be built into the walls at intervals in the height to prevent slipping.

§ 70. *Waterproofing in Rooms for Shower Baths, etc.*

On top of finished concrete of floor construction lay four (4) layers of felt, each layer solidly cemented together and covered on top with cementing material; turn this waterproofing back of shower-bath compartments and on all walls and partitions throughout up to the height of 12 inches, special care to be taken in connecting waterproofing to all pipes passing through the floors and walls and to floor drains in shower-bath compartments.

§ 71. *Warranty for Waterproofing.*

All waterproofing shall be done in the best and most workmanlike manner; only the best materials are to be used, and all of the work is to be left perfectly tight and an absolute protection against water and dampness is to be provided. All of this work shall be and hereby is guaranteed by the contractor for the period of two (2) years and all leaks are to be made water-tight during such period.

§ 72. *Face Brick for Men's Swimming-Pool Room.*

The walls of the men's Natatorium, from the level of the enameled brick wainscoting to the ceiling, to be faced with best quality selected vitreous face brick of standard size, satisfactory to the architects, and of color to be selected, laid in running bond, bonded into the walls every sixth course in height with full headers. All arches to be formed of bonded voussoirs, flat arches to be set with a slight camber.

§ 73. *Enameled Brick.*

All enameled brick to be first quality selected white enameled brick of standard English size, laid in running bond, bonded into the walls with clip bonding every sixth course in height. It is required that the brick to be selected shall have been used in at least three prominent buildings. It must be guaranteed against crazing, and must be straight, true and of even color throughout. Joints not to exceed 3-16ths inch in thickness, and to be jointed with a steel jointer, mortar to be as specified.

§ 74. *Waiting-Rooms.*

Enameled brick to be used as follows:

The walls in waiting-rooms for men and for women (except in attendant's office) to be faced with enameled brick to the level of top of window sills, enameled brick to be raised up from the finished floor level at bottom to admit of 1 inch of terrazzo base, the face of wainscoting to be set out from the walls ⅜ of an inch, so that face of enameled brick and face of plastering above will be flush, wainscoting to be finished on top with a special enameled brick cap molding and neck molding to match enameled brick in color and material, with rounded edges, rounded angle brick to be formed for all exterior angles. Cap molding to be set out from face of wainscoting to receive plaster trims of windows, with returns rounded at door trims.

§ 75. *Joints in enameled Brick Work.*

All joints in enameled brick work on the face shall be raked out, and pointed up when directed, so as to avoid spalling of the glazed edges of bricks through pressure.

§ 76. *Cleaning of Face Brick and Enameled Brick.*

All face brick and enameled brick shall be neatly pointed with mortar as specified, and cleaned down at completion with fiber brushes and water, no acid to be used, and left perfect and clean throughout to the entire satisfaction of the architects.

§ 77. *Protective Casings for Face Brick and Enameled Brick.*

The contractor will be held strictly to account for the care and preservation of all face brick work and enameled brick work, and shall take such precautions and use all necessary protective casings of boards and other materials to protect same from injury.

§ 78. *Bathroom Seats.*

Wooden seats in connection with shower baths, and bathtub rooms, to be of oak to match the trim of rooms, 1⅛ inches thick, with rounded edges. Seats to be secured on underside to oak cleats bolted to the marble and to be set with a slight pitch toward outer edge.

§ 79. *Doors to Shower Baths, Bathtub Rooms and Water-Closets.*

Doors to shower-bath compartments, bathtub rooms, and water-closets in toilet-rooms to be paneled as shown and 1¼ inches thick, and hung on marble partitions and brass frames with approved box flange hinges as specified under "Hardware," and set to remain open, doors to be raised up from the floor as shown.

§ 80. *Coat Hooks.*

Coat hooks to be of solid bronze, 4 inches over all, with two points to each hook, bolted through the marble partitions, with all required bolts, nuts, etc. Each shower-bath dressing-room to have four hooks, each water-closet compartment to have two hooks, each bathtub room to have four hooks.

§ 81. *Metal Numbers.*

Each shower-bath compartment and bathtub room to have approved composition metal numbers on doors.

§ 82. *Plumbing Pipes.*

All exposed iron plumbing pipes shall be cleaned and painted two (2) coats of paint, sandpapered, and one (1) coat of aluminum bronze varnish, except in cellar, where they shall be painted two (2) coats of paint.

§ 83. *Marble Work.*

All marble work, throughout, including all marble for plumbing, wainscoting, partitions, etc., to be best quality carefully selected uniformly light-veined Italian marble, well fitted, carefully and properly set with close joints, with all exposed surfaces and edges well polished. All edges to be rounded with ¼-inch radius. The thicknesses specified shall be in the finish. All marble shall be filled in solid at the back with gauged mortar, and carefully set in plaster of Paris, and anchored together with polished brass angles, bolted through marble and clamped and secured with brass clamps, brass bolts and screws in the most substantial manner. The use of iron angles, iron wire, etc., will not be permitted.

§ 84. *Marble Wainscoting, Partitions, etc.*

Wainscoting around all walls of shower bathrooms for men and for women, and at back and ends of shower baths and dressing compartments and bathtub rooms to be ⅞ inch thick and 7 feet high from finished floor, allowing for 1 inch of granolithic and terrazzo base. Shower-bath compartment partitions to be of same height, 1¼ inches thick, fronts to be 1¼ inches thick and 7 feet high from finished floor and raised up from the floor 6 inches. Marble in angles in shower-bath compartments to be ⅞ inch thick and of sufficient width to cover plumbing and to be the full height of partitions in two pieces with ⅞-inch caps on top, all to be secured with round-head brass screws for access to plumbing. Wainscoting around all walls of bathtub rooms to be ⅞ inch thick, 7 feet high from finished floor, allowing for 1 inch of terrazzo base; dividing partitions in bathtub rooms to be same height, 1¼ inches thick, fronts to be 1¼ inches thick, and 7 feet high from finished floor and raised up from the floor 6 inches.

Entrance vestibules to shower-bath rooms for men and for women to have marble wainscoting in vestibules on all walls, and on shower-bath room on all sides, ⅞ inch thick and 9 feet high, inclusive of 2-inch molded cap molding on both sides.

§ 85. *Marble Pedestals.*

Marble pedestals at easterly end of swimming pools to be of specially selected white Italian marble and cut out of the solid according to full-size detail drawings, all moldings to be carefully cut, all edges and angles to be rounded, pedestals to be carefully anchored in wall below with brass anchors, all joints to be made water-tight, do all required cutting and drilling in pedestals for plumbing connections and for brass railings; ornamental heads shown on pedestals will be of bronze and will be furnished and set as specified under "Structural Steel and Iron Work."

§ 86. *Brass Frames, Railings, etc.*

Brass frames on all shower-bath and tub bath rooms, and on toilet-room partitions, to be constructed of 2-inch heavy polished brass pipe, of standard pipe size and of color to correspond to plumbing pipes, for the support of partitions and screens on top. The supporting legs under partitions to be constructed according to design shown, of same material. On the sides of the compartments of each shower and in all bathtub rooms as indicated on the drawings, set brass wire screens in brass channel frames neatly fitted to top of partitions and brass supporting frames, channels to be 1¼-inch inside diamond mesh set in brass frames, secured to channels. All of this work to correspond in finish to supporting frames and legs for partitions.

§ 87. *Brass Railings and Ladders.*

Railings around each swimming pool on the level of aisles, and hand rails around all sides of pools at the level of overflow gutters, and all ladders on sides of pools shall be constructed of heavy polished brass pipe of standard pipe sizes with screwed joints so constructed that no portion of threads will be visible, all connections and flanges to be made according to full-size detail drawings and to be rounded ball connections with all edges of flanges rounded. Flanges at floors to be rounded out to finish flush with the floors and to be secured into wrought-iron pipe anchors filled with cement mortar, one (1) part approved Portland cement and two (2) parts sand and built into the concrete of floors during construction of same and bolted to steel beams. Iron pipes to be painted two (2) coats of asphalt paint and to be constructed on top for connecting brass standards of railings and ladders. Where the waterproofing under floors and back of walls is perforated for connections, sheet lead flashing shall be used, hand rails at the level of overflow gutters to be secured in a similar manner. Railings on level of aisles to have two (2) inch top rails and standards and 1½-inch intermediate rails and 1½-inch braces for standards which shall be secured to top edge of overflow gutters.

Hand rails at level of overflow gutters to be 1½-inch with 1-inch braces and standards, secured into walls and top edge of gutters.

Ladders in swimming pools to have two (2) inch pipe strings and 1½-inch railings and braces, and heavy brass tread sockets, and 6 x 1½ inch selected locust wood treads, rounded at all angles and edges and secured with brass machine screws to brass tread sockets, treads to be covered with heavy fluted rubber. All of this work shall be secured together in best manner and made firm and rigid and left clean, well polished and perfect throughout at completion of building to the satisfaction of the architects. All of this work shall be thoroughly protected with vaseline and covered with muslin securely tied on until removal is ordered by the architects, and finally cleaned and polished.

§ 88. *Glass Work.*

The swimming pools shall be lined on all sides with best quality white glass of manufacture acceptable to the architects, and equal to sample in architects' office; glass to be of largest possible dimensions and free from waves, flaws and imperfections of any kind, finished on all exposed surfaces with a smooth dull polish satisfactory to the architects, all slabs to be at least ¾ of an inch in thickness, all edges to be ground to true lines and to fit accurately. All of this work shall be set against a backing composed of one (1) part Atlas Portland cement or other equally acceptable to architects, and two (2) parts clean, sharp grit sand, roughly scored over all surfaces. Glass to be filled in the back with thoroughly slacked gauged mortar, and carefully set in plaster of Paris with close joints, and thoroughly anchored into walls and together with heavy brass wire, brass bolts and anchors, no iron shall be used for this work. Where joints are uneven in setting they shall be carefully ground to even surfaces and polished.

§ 89. *Cutting, Drilling and Repairing.*

Do all drilling, cutting and repairing of glass required for railings, ladders and plumbing connections and for the work of other mechanics and finish up after them.

§ 90. *Guarantee for Glass Work.*

The contractor shall and does hereby guarantee all glass work against loosening, swelling, falling off, and cracking for a period of two years. All of this work shall be left clean and in a perfect condition at completion.

§ 91. *Terrazzo Floors and Bases.*

Terrazzo floors and bases to be laid in the waiting-rooms, in aisles, bath-tub rooms, and vestibule of shower-bath room for men, and vestibule in shower-bath room for women, in toilet-room for men, and in toilet-room for women (including slop-sink rooms and closets in toilet-rooms), and in entire floor of men's Natatorium.

Overflow gutters and borders and coping in swimming pools to be formed of terrazzo, gutters to be pitched toward drain outlets, all edges and angles in gutters and coping to be rounded, gutters to be made absolutely water-tight.

All of this work to be set true and level throughout and pitched toward floor drains under showers, and rubbed to a smooth surface after setting, and cleaned and rubbed again finally to a dull polish and left complete and in perfect condition, without spots or stains at the completion of the building.

§ 92. *Floor Tiling.*

All floor tiles shall be of the best quality vitrified tiles, equal to the best manufacture, set true and level with close joints, on a cement bed composed of Atlas Portland cement (or other cement equally acceptable to the architects), and sand in proportion of one (1) part cement and one (1) part clean, sharp grit sand, all top joints to be wiped out carefully, and filled with pure cement. The bottom of each swimming pool to be tiled with vitrified mosaic tile; in colors to be selected, border to be composed of ½-inch square tile, turned up on the walls four (4) inches and curved at bottom with a radius of three (3) inches, and laid out on the level of the bottom of pools twelve (12) inches from sides of pools inside of this border, cover the entire bottom of pools with one (1) inch round vitrified tiles, in colors to be selected.

§ 93. *Cutting, Drilling and Repairing, etc.*

Do all cutting, drilling and repairing of tile work required for plumbing connections, ladders, etc., and for the work of other mechanics, and finish up after them, and thoroughly protect all brass work before cleaning; all cracked or broken tile to be removed at the completion of the building, all of the work to be left clean and in perfect condition to the entire satisfaction of the architects.

§ 94. *Guarantee for Tile Work.*

The contractor shall and does hereby guarantee all tile work against loosening swelling and cracking for a period of two (2) years.

CHAPTER XVIII

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* Arranged by year of publication. Compiled by W. P. Gerhard, C.E.

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APPENDIX

BATHING IN VARIOUS COUNTRIES

1. *Russian Bath Houses* — No Russian can be without his bath, and the poorest peasant even tries to obtain a bath at least once a week. In all the larger villages, hamlets and towns one therefore finds in almost every street one or more bath houses, from the simplest to the most luxuriously fitted up. The sanitary condition of these bath houses, however, is all but satisfactory. In the cities of Moscow, Charkow, Kursk and the majority of the provincial towns the public bath houses, intended for the lower classes of the population, consist usually of two large halls, the one intended for the men, the other for the women. These are usually kept tolerably clean and neat. On the other hand, in the majority of the smaller towns and in some provincial towns, as, for instance, in Grodno, Minsk, Wilna, Plonsk and numerous others, the bath houses are indescribably filthy, particularly the bath houses of the Jewish population.

Bathtubs are used in Poland and in the Baltic Sea provinces, while in all other parts of Russia a steam, hot-air or vapor bath is preferred. While the people's baths in Russia are usually kept in an unsanitary condition, the bath houses for the well-to-do in the larger cities are nearly always neat and clean and fitted up very comfortably, though the price of admission is often quite high, viz., three rubels or about two dollars and sometimes even more.

The waste water from the bath houses usually runs directly into the nearest river, and often causes a serious pollution of the drinking water, as, for instance, in Podolsk in the province of Moscow. Frequently the drainage is insufficient or defective, causing a bad pollution of the subsoil. The bath houses of Russian towns are also important from the point of view of sanitation, because almost without exception they constitute places for sexual excesses, and consequently form a principal cause for the distribution of syphilis, which, as is well known, is very frequent in Russia. The above is also true of the river baths, where the sexes bathe promiscuously, the feeling of modesty being very little developed or known in Russia. — *Abstract from a paper on "Sanitation in Russia," by* ARMY SURGEON D. WILKE *of Dresden, translated by* W. P. G.

2. *People's Baths in Russia* — As far as we can judge from available historical sources, the Slavs of olden times, like some other Eastern nations, did not cultivate much the question of personal cleanliness. In some historical writings of the sixth century we find it stated that the Slavs did not pay attention to their outward appearance, and that they used to appear at public meetings in dirty clothes, their bodies and faces covered with dust. On the other hand, a historical note, dating from the year 996, mentions that bathing apartments existed in some of the monasteries, where also some special bathing attendants were employed. It is also related that in the year 946 some delegates, who came to see the Grand Duchess Olga of Russia, were ordered by her to be killed in the baths, which she had had prepared for them.

After the dates mentioned, news about Russian bath houses are lacking, and the first later mention is in a book of laws, issued by Czar Alexis Michalowitsch in the seventeenth century, in which some regulations regarding bath houses in cities are given. These city bath houses, or rather bath apartments, were under control of the state and remained so until the beginning of the nineteenth century. At the present time the public bathrooms in cities are exclusively private undertakings. In a few cities, however, the military authorities have installed baths for the soldiers.

In rural districts one finds bathrooms in the majority of villages, many of them being of very primitive construction and equipment. Such bathrooms consist usually of a small hut, located close to the peasants' cottages and containing two rooms, the one for dressing and undressing, and the other one a compartment in which a large oven is located. Ordinary paving stones are heated in the oven and then water is poured over them so as to generate steam. A raised wooden bench is located in one corner for the use of the bathers, during sweating and while performing their ablutions. The poorer peasants have only a single room, and it is said that very poor people, who cannot afford to install a bathroom, use the large household baking oven for a steam bath.

In some districts of Russia, where there are but few rivers and lakes, there are many villages, containing one hundred or more houses, which scarcely have enough water for drinking purposes. In these villages it is stated that persons get a bath only three times in their lives, namely, at birth, before marriage, and before a burial. Where conditions as those mentioned exist, it is, of course, extremely difficult to advocate the introduction of people's baths, and even in the cities the question has not progressed favorably, though it must be noted that all Russians are very fond of the steam bath.

In the year 1895 the medical division of the Department of the Interior caused an examination and report to be made on the condition of the baths in the cities of the Russian Empire. This report contains a large amount of interesting data, not only regarding baths, but also about the water supply of cities, the quality of the water used, and the ultimate disposal of the waste water.

From a summary of this report it appears that information was received from 704 cities. Out of these, 503 cities had a total of 1,470 public baths, while 139 cities were entirely without any bathing facilities. No answer was received from 62 cities. It appears furthermore from the summary that the largest number of baths were found in the provinces which exhibit a higher civilization and culture, namely, the Baltic provinces, Poland and the districts about the Caucasian Mountains.

The report mentions that the sanitary conditions of the baths were not satisfactory, at least in 204 of the cities. The cheap bath houses, where either five or ten kopeks (equivalent to three and one-half to five cents of our money) are charged for a bath, were found to be in a particularly undesirable condition. Even the water used for bathing was reported to be contaminated in 129 cases.

As an immediate outcome of this report the medical department took measures to remedy the sanitary conditions of these places, and since 1895, in particular, water supplies have been introduced in many of the cities. In St. Petersburg the question of erecting municipal public bath houses has been freely discussed, but unfortunately many of the municipalities are not at present equal to the task, so that many years will pass before the question of people's baths will be solved in a satisfactory manner.

It might be mentioned also that public laundries or wash houses are entirely lacking in Russia, so that in many cases the poorer people take their wash to the bath house, which of course leads to undesirable and unsanitary conditions. — *From a paper by* PROF. DR. MED. O. VON PETERSEN, *St. Petersburg, translated by* W. P. G.

3. *People's Baths in Rural Districts of Norway* — By way of introduction, the author refers to the fact that although in German cities numerous people's baths have been established in recent years, bathing facilities are still lacking in the country districts, in small villages and in the isolated farm dwellings of the German Empire. He questions the fact whether the type of bath used for city people's baths, namely, the rain bath, would be the most advantageous one for a rural population. Is there perhaps, he asks, some other form of bath which would be better adapted for the needs of a rural population than the usual rain bath?

When the question of establishing people's baths was taken up in Norway, attention was directed particularly to choosing a form of bath suitable for rural districts, because in Norway nearly three-quarters of the entire population (about 1,600,000 inhabitants) live in the country, whereas only 600,000 inhabitants dwell in cities.

Physicians, who were the majority of those who became interested in the question of people's baths, declared almost unanimously in favor of a form of bath which is customary in Finland, as being the one best adapted to Norwegian conditions. A similar movement took place simultaneously in Sweden. The form of bath referred to is known as the Finland "*badstu*," or "*badstuga*," which translated means a bathroom. The best proof that this form of bath can be introduced universally in the peasants' farms may be found in examples from olden times, and likewise in some from modern times as given by the population of Finland.

The "badstu" existed in the times of the Vikings, and during the medieval ages it existed in a large part of central Europe, particularly in the Scandinavian countries. At those times bathing was a necessary requirement of living, not only for the lords of castles, but also for the townsmen and peasants. The bath houses later on became the centers of all sorts of excesses, the result being that the better class of people in cities avoided the "badstuga," until finally the authorities in many places in Germany and in Scandinavia had to close the baths up entirely.

At the present time scarcely any "badstugas" may be found in Norway, and the population of Scandinavia is largely restricted to tub baths or to river and sea baths. While this is true, it does not follow that this form of bath would in itself be unsatisfactory. It ceased to be popular merely because it did not answer the increased requirements of culture.

In this fact lies the remedy to be applied, namely, instead of having an ordinary bath hut, filled with smoke and with a dirt floor, the bath should be placed in a light and cheerful building, with large windows, with well-jointed flooring and with means for the removal of smoke. The requirements of modern civilization also demand that there should be during bathing an entire separation of the sexes.

The author of the paper made a trip through Finland in 1902, and found that there, too, a desire has sprung up to improve upon the primitive conditions which still largely exist in the eastern and northern parts of that country. During his journey the author found that in the western and southern districts of Finland the "badstugas" had been already somewhat modernized, because the cultured population of Finland does not desire to lose entirely its favorite form of bath.

A brief description of a Finland "badstu" may not be uninteresting. It usually consists of a small house, a hut, or a single heated room, in which the bath is taken. The bath itself is a steam or vapor bath, and the intended sweating is brought about by the heated air. The bath is really an intermediate between the dry hot-air bath (Roman bath) and the steam bath saturated with moisture (Russian bath). The air in the room is heated by a bath stove constructed of masonry. Large round stones are placed over the fire in the grate, and after the fire has gone out and the stones have become heated, hot water is poured over the stones and steam vapor thus enters and fills the room. By repeating this operation a temperature of from 35° to 50° Celsius (95° to 122° Fahr.) is attained, and the heat of the apartment may be regulated according to the amount of water poured over the stones. There are a number of benches in the room, arranged in a series of terraces, so that the bathers can choose whatever temperature is most adapted to them; thus those who can endure a high temperature and desire to perspire freely select the upper benches, whereas others who are satisfied with a lesser degree of heat remain on the benches nearer to the floor.

After having perspired freely the bather takes a pail of warm water and soaps the entire body, after which the soapsuds are removed by a few pails of lukewarm water poured over him. Finally a few pails of cold water are used before leaving the bath, so as to avoid the danger of catching cold.

The author points out that perspiring is not absolutely necessary in such a bath, and that this may be restricted to those who wish to take a medical bath, or else to persons who, like the inhabitants of Finland, have become used since infancy to this form of bath. He states also that many of the original inhabitants of colder climates, like the Slavs, Teutons, the Eskimos and the Indians, used instinctively a form of bath similar to the one described. He argues that this form of bath could be improved as much as the rain bath has been in the past years. He claims that it is an excellent type of bath for the people of rural districts.

Some of the advantages which the "badstuga" offers, as compared with the rain bath, are that it requires no special bathing appliances whatever, and hence is much more ~~economical in first construction~~. A small bath house of this kind may be erected near the barn and may be used at other times as a laundry, as is already the case in some instances in Norway. It is not necessary even to erect a special house, but any spare room, in the storehouse for instance, or in the cellar, may be transformed into a bath.

For baths in public schools the author advocates the installment of such types of baths in addition to the rain bath.

Since the question of people's baths has been agitated in Norway, a large number of village baths of the above type have been erected in the past few years. In a more modern form it has also been installed in a few of the cities. In Drontheim, for instance, the third largest city of Norway, having a population of 25,000 people, there are four people's baths, and the two largest of these contain both rain baths and the above-described vapor baths. Experience there has shown that the people seem to give the preference to the "badstuga" form of bath and not to the rain bath. These modern people's baths have been constructed and equipped with due regard to comfort and sanitation. All rooms are light and clean, the floors and walls are covered with white tiles and the benches consist of white marble. Similar bath houses exist now in several of the largest cities of Norway.

Among the advantages, the author claims that it is the cheapest form of bath, both as regards first cost and running expenses. He also points out that the use of the "badstuga" bath hardens the body. In Finland, for instance, many persons using such a bath in winter leave the room unclothed and roll themselves over in the snow. Persons not familiar with this form of bath might suppose that the quick change in temperature would cause colds, but all authorities on the subject are agreed that of all forms of baths the "badstuga" type is the one which offers the greatest immunity from catching cold.

The author further claims that the bath has a decided tonic and stimulating effect. In Finland the people use it when they come home in the evening tired out from work, in order to *refresh* themselves.

Of the drawbacks which this type of bath has the author mentions the insufficient change of air in the room. He claims, however, that no serious difficulty exists about providing proper ventilation. Another objection, sometimes raised, is that this form of bath involves congregate bathing, which to many persons is not congenial. The same objection, however, might be raised against swimming baths, but in practice it is found that the majority of people, especially the younger persons and those who have performed military service, do not object to bathing together. As a curiosity the author mentions the fact that the people of Finland are accustomed and prefer to have female bath attendants.

The author's conclusion is that the "badstu" bath may successfully compete with the rain bath; that for rural districts it is superior, and that even for baths in cities it may be placed side by side with the rain or douche bath. At present the tendency in Norway, Sweden and also in Denmark is to maintain the form of bath described in the preceding paragraphs. — *From a paper by* DR. E. MOINICHEN, *Health Officer of Aurland, Norway, translated by* W. P. G.

4. *Bathing in Finland* — The primitive customs described in the following exist in the most northern part of Sweden, Norway and Finland, and are still met in some out-of-the-way places in other provinces, more especially in the region between the Gulf of Bothnia and North Cape, though formerly they were prevalent farther south and probably all over Scandinavia. Some of them showed an innocent simplicity which at first astonished me. What struck me most forcibly was that the people did not see the slightest immodesty in them, and there was an utter unconsciousness of any harm; which brought to my mind the English motto, *Honi soit qui mal y pense* — "Evil to him who evil thinks." On the principle of this motto the reader is requested to read this chapter. I am simply describing things I have seen during my travels. These customs, like many others, will disappear, and I wish to put on record what will soon be a thing of the past.

My usual experience ran thus: I express the wish to take a warm bath, and at once the preparation begins. The cow house undergoes a complete transformation; the great iron pot, encased in solid masonry in a corner, used to cook food for the cattle, is thoroughly cleansed and filled with water; when this has become heated the fire is extinguished; everything has been thoroughly swept, and new straw is spread around for me to step upon, so I shall not soil my feet; I am just in the kettle when a stout girl of twenty summers, more or less, jumps in, dress and all, saying, "Paulus, I have come to help you." The words are hardly spoken before she begins to rub me with soap in a most forcible manner, and then to switch me with birch twigs. The only thing to be done is to consider myself her little brother, and I submit in the meekest possible manner. I have been subjected to the same treatment, minus the switching, in Stockholm and other places, but by women old enough to be my grandmother.

One of the most characteristic institutions of the country is the "sauna" (bath house), called "badstuga" in Swedish. It is a small log house, built very tight, with no windows, having a single aperture above to let the smoke out; in the center is an oven-like structure built of loose stones, under which a fire is kept burning till they are very hot; then the fire is extinguished and the women clean the place thoroughly of ashes and soot, the smoke hole having been in the mean time closed. A large vessel filled with water is placed within; a number of slender twigs, generally of young birch trees, are put into it, to be used as switches. The bath house stands by itself, and at some distance from the other buildings, for safety in case it should take fire. Every Saturday evening, summer and winter, all over that northern country smoke is seen issuing from these structures. It is the invariable custom for all of the household, on that day, to take a bath, for the work of the week is ended and the beginning of Sunday has come. After washing, all put on clean linen and their best clothes.

The stranger, the passing inhabitant of the cities, does not bathe with the people, for they are shy; he may have his bath, but all alone. It was only when they had come to regard me as one of themselves that I was allowed to accompany them; then the neighbors, old and young, would often come to bathe and keep company with Paulus.

I remember well my first bath *en famille.* One Saturday afternoon a couple of young fellows, friends of mine, as the girls were giving the last touches in cleaning the badstuga, shouted, "Paulus, take a bath with us to-day." "Yes, do," exclaimed the rest of the company, among whom were the father and the mother of the large family. The weather was piercing cold, the ground covered with snow, and I was glad that the bathing place was within a stone's throw of the dwelling. From my window I noticed several maidens wending their way with rapid steps towards it, in a costume that reminded me of Africa, minus the color. I did not wonder at their speed, for the thermometer stood below zero. Soon three rather elderly women took the same route from a neighboring farm, but the oldest two were clothed with old skirts around their waists; other young women followed, and all were quickly lost to sight behind the door, which they at once shut. They must be about to hold a sort of levee in the bath, thought I. Several aged men then made their appearance, followed in quick succession by younger ones, and children of all sizes; none had on any clothing whatever, and they also joined the throng inside.

When I saw the field clear, I thought it was time to make a rush for the building. I emerged from my room at a running pace, for I was dressed as scantily as those who had preceded me. I hastily pushed the door open, and was welcomed by the voices of all the company as I closed it behind me. The heat was so intense that I could hardly breathe, and I begged them not to raise any more steam for a while; the sudden transition from twenty degrees below zero to such an atmosphere overpowered me. As my eyes became accustomed to the darkness of the place, by the dim light which came through the cracks of the door, I began to recognize the faces of my friends. There were more people than usual, for all the neighbors had come to have a bath with Paulus.

At first I seated myself on one of the lower benches built around, after a while getting on the other above. More water was poured on the hot stones, and such a volume of steam arose that I could not endure it, so I jumped down again and reclined in a half-seated posture in order to breathe more freely. In a short time I was in a profuse perspiration; again and again steam was raised by pouring water on the stones, till at last the hot air and steam became extremely oppressive.

Now and then we poured water on each other, which caused a delightful sensation of relief, then with boughs every one's back and loins were switched till they smarted severely. "Let me give you a switching, Paulus," a fair-haired damsel or a young fellow would say, "and after you get yours, I want you to give me one." This operation is beneficial, as it quickens the circulation of the blood in the skin. In about half an hour the people began to depart, first submitting to a final flagellation, after which cold water was poured upon the body; then all went home as naked as they came. As I emerged from the hut the sensation was delightful, the breathing of the cold air imparting fresh vigor and exhilarating my spirits; I rolled myself in the snow, as did some others, and afterwards ran as fast as I could to the farmhouse. In some places the men and women, as if by agreement, do not return together, and the old women wear something around their loins as they go or come from the bath. I have gone out of the bath house with the mercury at thirty-two degrees below zero. It is not dangerous to walk a short distance as long as the perspiration is not suddenly and entirely checked.

On returning one does not dress at once, for he must get cool gradually and check the dripping perspiration. I had hardly been fifteen minutes in my room, when suddenly the door opened (the people here, as is the case in most parts of Sweden, never knock at the door), and the wife, who had dressed herself, came in, and was not in the least abashed at my appearance; she talked with me as if I were in my morning-gown. The door opened again, and a grown daughter entered, and then another. I began to fear that all the neighbors were coming, as if to a reception. Though they did not seem in the least troubled, I was; I seated myself on a chair, however, and for a short time we carried on a rambling conversation; they then left, and I dressed myself and went into the stuga, or family room. At first I could hardly keep my countenance, for the sight was extremely ludicrous. There was a crowd of visitors, neighbors of different ages, and among them the three old fellows — a grandfather, father and an uncle — who were sitting upon one of the benches with legs crossed minus a particle of clothing, shaving themselves without a looking-glass. Nobody seemed to mind them, for the women were knitting, weaving and chatting. This was certainly a scene primitive enough. When the men finished shaving, clean shirts were brought, and they then dressed themselves while seated. The men usually shave once a week, oftener when courting, and always after the bath, for the beard then becomes soft.

These people are the only peasantry in Europe who take a bath every week, and they are very healthy. I never failed to bathe every Saturday. The custom described has come down from olden times; the Norsemen called Saturday, Laugadag (washing day), later Loegadag, and at present Loerdag, but it is now chiefly observed in the regions of Scandinavia, which we had crossed during the winter. Such habits can prevail only in a neighborhood remote from cities, where simplicity of manner has not been tampered with or modified by what are called higher types of civilization, and where a dissolute life is entirely unknown. From childhood the people have gone to the bath together, and their children are brought up in the same way; innocent of guile, they no more imagine harm in what they do while at the bath than if they sat down together at dinner in the customary way, still more, the statistics show no more moral people in Europe. After the bath the women wear high-necked dresses, and are very particular in their deportment; no debased woman would be tolerated in any hamlet in that part of the country.

The custom of promiscuous bathing is a very ancient one in Europe, and prevailed extensively among our forefathers. Cæsar, in his Commentaries, speaks of the Germans of his time as follows: "Those who remain chaste the longest bear the highest reputation among them; this they consider insures stature to some, to others manliness and strength. . . . They all bathe promiscuously in rivers, without distinction of sex, and wear skins or slight coverings of deer hides, a large part of the body being nude; and Tacitus, Pomponius and other Latin writers add their testimony to the chastity and purity of the people.

We must not be too hasty in condemning what we have outgrown or never known. Every day we witness customs which are not according to our ideas of propriety. We at times see a mother nursing her babe in public, but that certainly does not make her a woman deserving of reproach. In considering the subject, we should bear in mind that if much has been gained by our advancing civilization, our ancestors were free from many vices which are the outgrowth of some civilized habits. — *From "The Land of the Midnight Sun," Summer and Winter Journeys through Sweden, Norway, Lapland and Northern Finland, by* PAUL B. DU CHAILLU, 1882, *Chapter XVII, Old-time Bathing.*

5. *Bathing in Japan* — (*a*) There is no social life in Japan which has been more ignorantly, and in some cases willfully, animadverted upon than the custom of *public bathing;* nevertheless I dare to say that there is no feature in Japanese life to be more heartily commended than this same system of public bathing. But by this assertion I do not mean to suggest that we shall forthwith proceed to establish baths after the Japanese style, and take them after the Japanese fashion. The Japanese, as well as some other Eastern people, have for centuries been accustomed to see nakedness without its provoking among them the slightest attention, or in any way suggesting immodesty. . . .

In Japan, among the lower classes, the sexes bathe together, but with a modesty and propriety that are inconceivable to a foreigner until he has witnessed it. Though naked, there is no indecent exposure of the person. While in the bath they are utterly unmindful of each other.

The grossest libels have been written about the Japanese in reference to their custom of public bathing; and I hazard the statement, without fear of contradiction, that an intelligent Japanese, seeing many of our customs for the first time, without knowing the conditions under which they had grown up, would find infinitely more to condemn as immodest, than an intelligent foreigner would find in seeing for the first time certain Japanese customs, with the same ignorance at the outset as to what such customs implied.

If cleanliness is next to godliness, then verily the Japanese are a godly race. Rein says: "The cleanliness of the Japanese is one of his most commendable qualities. It is apparent in his body, in his house, in his workshop, and no less in the great carefulness and exemplary exactness with which he looks after his fields."

The simple statement, without qualification, that numbers of Japanese in their public baths bathe in the same water would seem a filthy habit. Certainly, if such a statement were really true in regard to our own lower classes, it would be a most filthy habit. When it is understood, however, that the Japanese working classes often bathe two or three times a day, and must of necessity enter the bath in a state of cleanliness, such as our workmen rarely if ever attain, the statement loses some of its force. When it is further added, that these people do not wash in the baths, but boil and soak in them for a while, and then upon a platform, with an extra bucket of water and a towel wash and dry themselves, the filthy character of this performance assumes quite another aspect.

A Japanese familiar with his airy and barn-like theaters, his public readings under an open tent-like structure, or gatherings in a room in which one or all sides may be open to the air even in midwinter, would look upon the usual public gatherings of our people in lecture halls, schoolrooms and other closed apartments, wherein the air often becomes so foul that people faint and struggle to the door to get a breath of fresh air, — a Japanese, I say, would justly look upon such practices as filthy to the last degree. And what would he say to one of our great political meetings, for example, where a vast unwashed herd of perspiring and excited people actually bathe their delicate membraneous lungs in the combined breath of hundreds?

. . . In Japan every village and every town, and in the city nearly every square, possesses public baths where, for the price of one cent or two, one may find conveniences for a hot bath; while in our own country public baths are only found in the larger cities, and few of these even can boast of such a luxury. . . . In Japan nearly every house among the higher and middle classes possesses the most ample arrangements for hot baths; and even among the poorer classes, in the country as well as in the city, this convenience is not wanting, with the added convenience of public baths everywhere attainable if desired.

There are many forms of bathing tubs, all of them large and deep. There are also many forms of foot tubs and large wooden tubs with high backs, in which hot water is poured. — *From* PROFESSOR MORSE'S "*Japanese Homes and their Surroundings.*"

(*b*) . . . Not only are the Japanese in their indifference to nudity more sensible and pure-minded than their censors, but in the matter of bathing and cleanliness they are, as a nation, infinitely more civilized than Europeans and Americans. That Japan has no "Great Unwashed" is a statement of such wide bearing that the Occidental mind can scarcely grasp its significance at first hearing. You may be hemmed in by the densest crowd in Tokyo on a sultry summer day, or stand among busy workmen whose scant clothing is wet, and never will your nostrils be assailed by that disagreeable summer odor of humanity, which would be noticeable in other countries under similar circumstances.

Being a nation of agnostics, the Japanese could hardly be expected to sympathize with the old Hebrew doctrine which places cleanliness next to godliness. They make cleanliness the first of all virtues, and the daily bath the first of all duties. While New York had to wait until the year 1891 before a project was started for supplying the Great Unwashed with baths at reasonable rate, the metropolis of Japan has offered such opportunities as far back as the records go. Tokyo has to-day about 800 public baths, in which 300,000 persons, or almost a fourth of the population, bathe every day, at a cost of one cent for each hot bath; and besides this every family, except some of the very poorest, has its own private bathroom in the house; or at least a tub and plenty of hot water. It you stop at the humblest village inn for lunch, a basin of water is brought, in which to wash the feet; and if you stay for the night hardly has a room been assigned to you, when a girl appears to conduct you to the bath, for the use of which no charge is made. Nothing surprises them more than a foreigner who refuses to take at least one hot bath a day. They themselves are more likely to take two or three; and the consequence is that they are the cleanest people in the world.

It has been said that they value the bath, not so much for its cleansing effect as for the enjoyment of a sensuous luxury. Suppose we were to grant this, what difference does it make, so long as it leaves them the cleanest people in the world? But it is not true. The aspect of their streets and houses shows that they value cleanliness for its own sake. They have, besides, a use for the hot bath, which may be considered unique. Their houses affording but poor protection against chilling winds, and having no fireplaces, the hot bath is frequently used as a last resort for getting warm.

. . . Farsari's guidebook attributes the premature aging of Japanese women in part to their too frequent indulgence in the hot bath, but Dr. Baelz, the best authority on Japanese physique, declares that these baths have many advantages, but not a single disadvantage, as far as he could ascertain. It is commonly supposed that hot baths unbrace the nerves and invite colds, but this is true only of *warm* and not of *hot* baths, such as the Japanese indulge in, at a temperature of 110° to 115° Fahr., which in some cases is increased to 120°, and occasionally even to 130°. Foreigners cannot endure such temperatures, but the natives revel in them, and the effect on them is so bracing and strengthening that they can, and often do, emerge from the tub and walk some distance in the coldest winter weather without a stitch of clothing on, and without catching a cold. When foreign physicians were first imported and looked up to in Japan, about twenty years ago, they actually succeeded in their ignorance in making the Government pass a law forbidding a higher temperature than blood heat; but the mistake was soon discovered, and the law repealed. To-day those of the foreign residents who are wisest have given up their cold baths, and try to approximate the Japanese temperature as closely as possible.

The Japanese bathtub is usually a square wooden tank, sometimes large enough to admit several persons at a time. The water can be heated in a short time by means of a copper tube standing in one corner of the tub, and having a grating for charcoal at the bottom. For economical reasons the Japanese never have bathtubs to lie in, but usually make them only wide enough so that one can sit or kneel, which requires less water, and therefore less coal.

So far all seems well; but there is (apart from the indifference to nudity) one thing about Japanese baths which is apt to stagger foreign visitors — the use of the same water by a number of persons. When the family bath is ready, the father, mother, children and servants all enter it in the order here given. In crowded inns a score or two of guests, entire strangers to each other, are expected to use the same water (to economize fuel). This may seem better than no bath at all, and as the natives wash themselves all over before entering the tub, the objection may be largely imaginary; but we cannot overcome our predilection for a fresh tub for each individual, and communism in bathing does not seem an inviting form of hygienic diversion. We have similar forms of aqueous communism at Baden-Baden, the hot baths in Switzerland and the large tanks in our Turkish baths; but there, at least, the water flows incessantly. Many of the Japanese are fastidious enough to have a bucket of fresh water poured over themselves after the communal tubbing.

It is not only the poorest families — those who cannot afford a tub at home — that frequent the public baths; many go there to gossip with friends; wherefore, as previously intimated, more than a quarter of a million of natives of Tokyo scrub, and boil themselves together every afternoon. In obedience to law, the bathrooms are no longer fully exposed to the street, but they are only closed below. Any one who chooses can look in through the latticed bars above; nor do the bathers object to such a proceeding. There is always a separate tank for women and one for men, but the partition between them is only a few feet in height, and what is stranger still a man may be seen waiting on a score or more of women on their side, while on the men's side a girl stands to receive the admission fee. There may be twenty or thirty men or boys on one side, and as many women and girls on the other, chatting, scrubbing, tubbing, some standing, others kneeling, before a small tub or bucket, using their bran bags, which make the skin soft and smooth. Soap is not favored, there is a superstition that it makes the hair turn red, and red is the color of the Japanese devil. Every minute one or two leave the room, their skins glowing with health, while the newcomers disappear behind a screen and in a moment emerge stark naked and join the chatting crowd. — *From* HENRY T. FINCK, "*Lotus Time in Japan.*"

(c) Would one see Japanese life in its simplicity he should visit any of the innumerable bathing resorts in the mountains. Bathing in hot water has had high attractions from the earliest times, possibly because nature has provided facilities so abundantly. Almost every district has its resort, where the hot water rushes out of the earth and at the expense of piping supplies endless opportunity for pleasure and healing.

Around the spring villages are built, in picturesque confusion, often clinging to the mountain-side, the foundations of one house level with the roof of the next, with narrow lanes and winding walks, thickly lined with cottages as if land were priceless in value, with the population as dense as in the metropolis. Sometimes the houses are in a valley, with a single street, and the hot water led in pipes of bamboo down its center.

One may provide himself, as he will, with rooms only, bringing his own servants, or, as with poorer people, cooking his own meals. This need be his only expense, save the tiny fee for the bath.

The bath occupies some prominent position, preferably the middle of the street, and the custom is for men and women to make their toilets in their rooms and then walk to and from the bath in complete unconsciousness of anything surprising or immodest. Or one may find an expensive suite of rooms in some fine inn, and be furnished a separate bath in private.

The springs vary in temperature and in quality. There are some which are pure hot water, some which are redolent of sulphur, many which are a compound of strange ingredients and some which are so very hot that even the Japanese need mercy. One, for example, much frequented by patients grievously afflicted, is of such a temperature that the unfortunates who must use it enter in companies at the sound of a bugle, and are cheered in their endurance by their attendant, who tells them every few seconds that only so much of their torments remains. One very strange bath, of exceptionally low temperature, only two degrees below blood heat, has bathers who remain in the bath for two weeks at the time, sleeping and eating in the water, floating at night with a stone on their stomachs to keep them in position. Naturally these baths are chiefly for those who need them, but in many a resort the pleasure is the chief thing, and it is not unusual for the visitor to take six or eight dips a day. — *From "Japanese Life in Town and Country," by* GEORGE WILLIAM KNOX. *G. P. Putnam's Sons.*

(*d*) Some Europeans have tried to pick holes in the Japanese system, saying that the bathers put on their dirty clothes when they have dried themselves. True, the Japanese of the old school have nothing so perfect as our system of daily renovated linen. But as the bodies even of the men of the lowest classes are washed and scrubbed daily, it is hardly to be supposed that their garments, though perhaps dusty outside, can be very dirty within. A Japanese crowd is the sweetest in the world. The charm of the Japanese system of hot bathing is proved by the fact that almost all the foreigners resident in the country abandon their cold tubs in its favor. There seems, too, to be something in the climate which renders hot baths healthier than cold. By persisting in the use of cold water, one man gets rheumatism, a second gets fever, a third a never-ending continuance of colds and coughs. So nearly all end by coming round to the Japanese plan.

The Japanese passion for bathing leads all classes to make extensive use of the hot mineral springs in which their volcano-studded land abounds. Sometimes they carry their enjoyment of this natural luxury to an almost incredible extreme. At Kawanaka, a tiny spa, not far from Ikao, in the province of Joshu, — one of those places of which there are many in Japan, which look as if they were at the very end of the world, so steep are the mountains shutting them in on every side, — the bathers stay in the water for a month on end, with a stone on their lap to prevent them from floating in their sleep. The caretaker of the establishment, a hale old man of seventy, stays in the bath during the entire winter. To be sure, the water is, in this particular case, one or two degrees below blood heat. Thus alone is so strange a life rendered possible. In another case some of the inhabitants of a certain village, famed for its hot springs, excused themselves to the writer for their dirtiness during the busy summer months. "For," said they, "we have only time to bathe twice a day." "How often, then, do you bathe in winter?" "Oh, about four or five times daily. The children get into the bath whenever they feel cold." — *From* B. H. CHAMBERLAIN, "*Things Japanese.*"

(*e*) Japanese bathing customs are peculiar. Perhaps there are no other people on earth that bathe as often as they. It is customary for every one, even the coolies, to bathe well the whole body every day. The baths are taken very hot — about 110° Fahr. Each private house has a large bathtub, which in many instances is capacious enough to accommodate the whole family at once. Besides these private baths each city and town has its public ones, where a good hot bath, in a place large enough for you to swim around, can be had for one cent. Men, women and children go into them at the same time, indiscriminately. Japan is a land of hot springs, so that almost every district has its natural hot baths. Most of them have medicinal value, and the people flock to them by the thousands. — *From* R. B. PERRY, "*The Gist of Japan.*"

(*f*) In such surroundings there seems nothing shocking or unnatural in seeing young human bodies bare to warm air. At Atami I was looking out of my window rather early in the morning, and noticed a pile of brightly colored garments lying on a wood heap. Nobody was about; but I heard laughter and young voices coming from a tumble-down bath house near by, and then, swift as light, a slender young girl came running out, the water flying in shining showers from her limbs as she sprang at one bound on the pile of wood; there she stood, naked and unashamed, her arms stretched high above her head, laughing out the joy of her heart to the rising sun, and breathing in all the freshness of the new day. I never saw a more beautiful picture of innocence and happiness. — *From* MRS. FRASER, "*Letters from Japan.*"

(*g*) Cleanliness is one of the few original items of Japanese civilization. Almost all other things Japanese have their root in China, but not tubs. We read in the Japanese mythology that the god Izanagi, on returning from a visit to his dead wife in Hades, purified himself in the waters of the stream. Ceremonial purifications continue to form part of the Shito ritual. But viewed generally, the cleanliness in which the Japanese excel the rest of mankind has nothing to do with godliness. They are clean for the personal satisfaction of being clean. Their hot baths — for they almost all bathe in very hot water of about 110° Fahr. — also help to keep them warm in winter. For, though moderately hot water gives a chilly reaction, this is not the case when the water is extremely hot, neither is there then any fear of catching cold.

There are some 800 public baths in the city of Tokyo, in which it is calculated that three hundred thousand persons bathe daily, at a cost of one sen three rin (about a half-penny of English money) per head. A reduction of three rin is made for the children. In addition to this, every respectable private house has its own bathroom.

Other cities and villages are similarly provided. Where there are neither bathing establishments nor private bathrooms, the people take their tubs out of doors, unless indeed a policeman, charged with carrying out the new regulations, happens to be prowling about the neighborhood; for cleanliness is more esteemed by the Japanese than our artificial Western prudery.— *From a Standard Authority on Japan.*

(*h*) When the temperature of the bath is raised above 105° Fahr. the effect is quite different, because its *modus operandi* is different. There is no longer a primary relaxing effect upon the peripheral vessels, but an intense stimulating effect upon the vaso-constrictors, which very soon fatigues the latter and eventuates in a dilatation of the vessels, filling the skin with blood, which, being heated, raises the internal temperature decidedly. The pulse rises in frequency, becoming feeble if the temperature is raised to 115°, and the bath is prolonged; collapse threatens; but removal from the bath is followed by a feeling of comfort and lightness.

Dr. Baelz, of Tokyo, has furnished accurate observations on the *hot bath*. Residing among a people with whom hot bathing is a daily practice, there being four hundred thousand baths given daily in Tokyo alone, he had exceptional opportunities for studying their effects.

The temperature adopted by the Japanese is usually about 130° Fahr.; Europeans indulge in baths of 104° to 109° Fahr. The head is usually bathed in hot water before the bath is entered, in order to relax and dilate the cerebral vessels, and thus prevent cerebral anæmia when the cutaneous vessels become greatly dilated. This is also aided by the sitting posture usually assumed. Palpitation of the heart and a decided sense of great heat are regarded as a signal for removal.

The first effect of such a bath is a *cutis anserina* and a pallor of the skin, lasting a few seconds; the pulse becomes slower and afterward more rapid. At first the respiration is not much affected; later it becomes purely thoracic. The temperature of the body rises slowly to 104° and over, this effect being due to heat retention, combined with direct absorption of heat. It occurs rapidly, often within six minutes; but it returns to normal in half an hour after the bath. The arteries become relaxed, the temporal artery assumes a dentritic form as in arteriosclerosis. The pulse is full; its curve is high. Prolonged stay in the bath produces vertigo and nausea. The consumption of albuminoids is not increased by the hot bath. On leaving the bath abundant perspiration ensues. The Japanese apply cold affusion before leaving the bath. It is a common error to suppose that colds are easily taken after hot baths. According to Baelz, this is impossible. While a warm bath relaxes the vaso-constrictors and thus predisposes to cold, the very hot bath produces a paralysis of the cutaneous vessels, which lasts some time and prevents their contraction when exposed to cold. This is proved by the fact that the Japanese run naked on the streets after their hot baths without taking cold. Nor does such a bath produce tenderness and consequent debility. On the contrary, it seems to stimulate and tone them up; but there is usually a slight loss of weight after continuous use. The sense of warmth produced by the Japanese hot baths is claimed to be so enduring that it is regarded as an economical method of keeping the body warm in winter in dwellings which are not heated. . . . Topp (in "Therapeutische Monatshefte," February, 1894) confirms the view of Baelz that the feeling of *bien aise* after hot (110°.Fahr.) baths taken after great muscular exertion is due to removal of fatigue products by the increase of oxidation. — *Extracts from* DR. SIMON BARUCH'S *Book, The Principles and Practices of Hydrotherapy.*

BATHS FOR DOGS.

It remained for the Germans to solve, in a measure, the question of how to maintain domestic animals, and principally dogs, in a clean and healthful condition in the city. It is, at best, a difficult problem to keep a dog in a city, and the greatest trouble arises from the fact that there is very little or no opportunity to bathe the dog.

During his recent visit of inspection of a large number of public bath houses in German cities, the author had occasion to notice that many of them had provision made, in the basement, for the bathing and cleaning of dogs.

The first public bath house where such provision was made was the public swimming bath at Stuttgart. The Guentzbath in Dresden has a similar provision, and the magnificent Karl Mueller People's Bath, erected in the city of Munich in 1901, from a gift to the city of a half million dollars, made by the late Karl Mueller, a wealthy civil engineer, is also fitted up with a special dog bath.

The illustration shows the dog bath, as the author saw it in the Guentzbath in Dresden.

In all cases baths for dogs are located in the basement of the buildings, and have a separate entrance, where bath tickets for dogs are issued. The dog baths must be well isolated, so that the bathers on the upper floors may not be unduly disturbed or annoyed by an excessive barking of the animals.

The bath usually consists of two parts, namely, an anteroom containing a number of stalls, where the dogs may be kept when waiting for their bath, and where they are also kept during the drying.

The bathroom proper contains in the center a bathing pool (see Fig. 130), which in some cases is built of concrete, in others lined with white glazed tiles. The approximate dimensions for such a pool are 10 feet by 12 feet. The pool must be provided with hot and cold supplies, with waste and with overflow. At one end of the pool there is a raised platform where the dogs are soaped, rubbed and cleaned previous to entering the pool.

Along one of the windows there is a table arranged with the necessary apparatus for the clipping or shearing of dogs. The appliances used for the purpose are run by electricity.

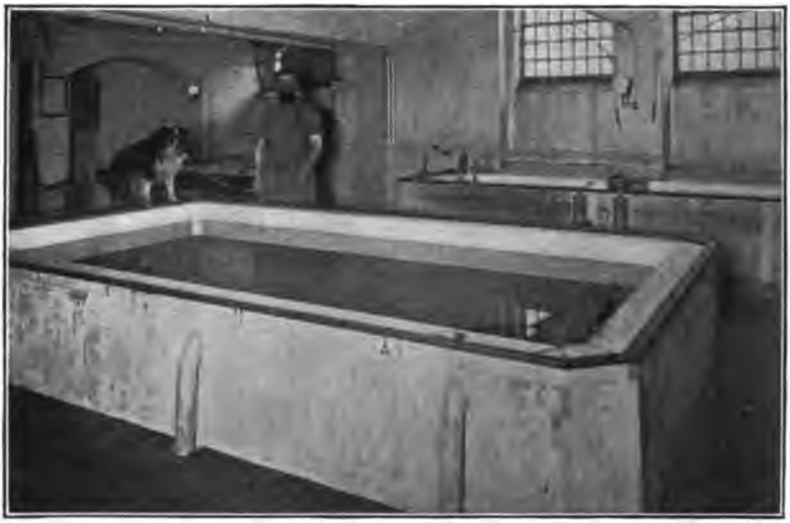

FIG. 130. A BATH FOR DOGS.

After being rinsed in the pool, where opportunity is also afforded for swimming, the dogs are dried with towels, and placed in the warmed stalls until they are completely dry.

A special trained attendant is in charge of the room, and only persons with dogs have access to the same.

The dogs must be brought into the bath led on a chain, and the owners must see to it that the dogs will not bark, fight or soil the vestibule leading to the bath. The attendant receives the dogs and the bath ticket issued for them, and is instructed to refuse admission to any dogs which are suspected of being in any way sick. Vicious dogs must be brought in with muzzle on, and the attendant has the right to request the owner to remain present during the cleaning process.

The stalls in the anteroom, where the dogs are kept, are usually in several tiers, and made of various sizes. They are provided with light lattice doors in front. Here there is also provision for drinking water for the dogs.

The cleaning process is as follows: first, the dog is washed thoroughly with warm water and soap, and then he is scraped with sponge, dog comb and scraper; after that he is douched so as to remove the soapy water, and finally he is placed in the large pool. On emerging from the same he is dried and kept in one of the stalls for about half an hour until thoroughly dry, or until called for by his owner.

The attendants are instructed to handle the animals gently, and no dog is permitted to be whipped, but in case the animal is inclined to be vicious, the attendant may call upon the owner to assist him.

The pool, the floor of the room, the table and the tools are kept neat and clean. From time to time the stalls are disinfected, and the combs, brushes, shears and scrapers are sterilized.

The water in the pool is frequently renewed and kept at a moderate temperature. The clipped hair and other waste are collected in tight metal cans, which are removed and frequently emptied.

The charges for this service are quite moderate. In Stuttgart the charge for cleaning one dog is 50 pfennigs or 12½ cents; an additional 10 pfennigs is charged for the use of the pool and 2 marks or about 50 cents for the clipping and shearing of the dog's hair, while for a partial clipping the charge is reduced to one and one-half marks.

In Munich the rules and regulations for the dog baths are quite elaborate. The charges vary, according to size of dog, and according to whether he is short-haired or long-haired, from

40 pfennigs or 10 cents, to 1 mark or 25 cents. The clipping and shearing also varies from 1½ to 3 marks, or from 37 to 75 cents, according to size of dog, and whether he is short or long haired.

When a dog is not called for three hours after the bath, a special charge for keeping the dog is made; dogs not claimed at the end of the day may be sent to the dog pound, in which case the owner must pay for transportation and for board.

It is said that "a merciful man is merciful to his beast." Among domestic animals none is a truer companion to man than the dog. Arrangements similar to those described and illustrated would, doubtless, be welcomed by owners of animals in our large cities. There is usually plenty of room available in the basement of the larger bath houses. The cost of the pool can be kept moderate, and the only additional expenses would be the wages for a specially qualified attendant.

The first experiment in this direction would soon show whether the income derived from the dog bath tickets would be sufficient to warrant the installment of this useful feature in some of our larger bath houses. — *Contributed by the author to "Modern Sanitation."*

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